

DOCUMENT RESUME

ED 226 519

EC 150 683

AUTHOR Stearns, Marian; And Others
TITLE Validation of State Counts of Handicapped Children.
Volume I--Procedures for Validating State Handicapped
Child Counts.
INSTITUTION Stanford Research Inst., Menlo Park, Calif.
SPONS AGENCY Bureau of Education for the Handicapped (DHEW/OE),
Washington, D.C.
REPORT NO SRI-P-URU-5830
PUB DATE Sep 77
CONTRACT 300-76-60513
NOTE 85p.; For related information, see EC 150 684.
PUB TYPE Reports - Research/Technical (143) -- Guides -
Non-Classroom Use (055)

EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS *Disabilities; Elementary Secondary Education;
*Federal State Relationship; *Handicap
Identification; *Incidence; *Program Validation;
Research Methodology; *Statistical Data
IDENTIFIERS *Education for All Handicapped Children Act

ABSTRACT

The report discusses issues regarding the validation of the child count data prepared by states to comply with P.L. 94-142, the Education for All Handicapped Children Act. It also proposes a validation procedure to assure the accuracy of the counts. The validation process is conceptualized, and steps in conducting an adequate state census are outlined. The design of a validation system is proposed, with the role of federal (Bureau of Education for the Handicapped-BEH) and state authorities discussed. Current child count procedures used in Washington, New Mexico, Mississippi, Georgia, and Illinois are described in terms of organization, techniques, and data collection. Recommendations are made for BEH technical assistance. Included in two appendixes are a paper by W. Madow, "Sampling Plan for Post-Censal Survey of LEA Counts of Handicapped Students" and a discussion of subsampling. (CL)

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ED226519

September 1977

VALIDATION OF STATE COUNTS OF HANDICAPPED CHILDREN

VOLUME I — PROCEDURES FOR VALIDATING STATE HANDICAPPED CHILD COUNTS

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U.S. OFFICE OF EDUCATION
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WASHINGTON, D.C. 20202

Contract No. 300-76-60513

SRI Project URU-5830

EC150683

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I INTRODUCTION

Under the Education for All Handicapped Children Act of 1975 (PL 94-142, referred to subsequently as the Act), federal funds will be distributed among states and among local educational agencies (LEAs) within states, for the purpose of assisting them to provide a free, appropriate education to all handicapped children. The initial distribution of funds will take place in October 1977 and will continue under permanent authority of the Act.

The states' and local educational agencies' entitlements to the funds will be based on the average of two counts (October 1 and February 1) of handicapped children aged 3 to 21 receiving special education and related services. State educational agencies (SEAs) are responsible for collecting the counts from local educational agencies, including intermediate educational units (IEUs), for aggregating the counts to the state level, and for reporting them to the Bureau of Education for the Handicapped (BEH). SEAs are also responsible for certifying that the counts are accurate and unduplicated, and for ensuring the maintenance of documentation that would permit auditing the accuracy of the counts. BEH, acting on behalf of the Commissioner of Education, has a responsibility to validate the counts in order to assure Congress and the public that the funds are disbursed fairly, according to the provisions of the Act.

The SRI Study

A study by SRI International (formerly Stanford Research Institute) was funded by BEH to investigate procedures that BEH could implement to validate the counts of handicapped children, on which the grants of funds would be based. The government's request for proposals focused on the development of a sampling plan based on estimates of the counts. This was to be used to select states and local agencies for detailed validation. The steps proposed were: (1) to generate expected counts for

each state, using existing data bases on the prevalence of handicapped children, (2) to develop measures of discrepancy between the expected and reported counts, and (3) to develop a sampling plan for selecting states for detailed validation on the basis of the discrepancy measures.

However, as SRI staff became better acquainted with the details of the Act and proposed regulations, the needs, resources, and expectations of BEH, the current capability of some states for generating an accurate count, and the paucity of information on the numbers of children with handicapping conditions in the population, the focus of the study was modified. The need to develop a plan for sampling states was subordinated to the need to understand what validation implied and to develop an overall procedure that BEH could implement to fulfill its obligation to assure accurate counts. Also, the estimates of the counts were eventually recommended for use only in editing counts submitted to BEH by SEAs.

It is clear that the use of estimates in validating counts depends on the degree to which the estimates are judged to be accurate. If they are judged completely accurate, any deviations of counts from the estimates could be attributed entirely to invalidity of the counts. However, our assessment of the data and methods available for estimating counts^{*} indicates that the accuracy of the estimates is generally unknown and that, except for gross discrepancies, greater faith can be placed in the accuracy of the counts made by the states than the accuracy of the estimates as long as the actual counts were generated using reasonable procedures. Therefore, the SRI study focused on the use of reasonable procedures by states for generating the counts rather than on discrepancies between the counts and estimates of the counts.

As discussed below, we feel that the proper design of the validation process requires recognition of the multifaceted mandate that the Act imposes on BEH, and consideration of the child count validation in relation to BEH's technical assistance, monitoring compliance, and evaluation

^{*} See Volume II for a complete discussion.

roles. It is also necessary to be cognizant of the division of responsibility mandated by the Act between the Commissioner of Education, the SEAs, and the local educational agencies--in particular the emphasis in the Act on the first-line responsibility of SEAs for ensuring that the major provisions of the Act are carried out. Finally, it is necessary to recognize the relationships among the provisions and requirements of the Act that bear on the child counts. Taking these issues into account, we recommend to BEH a validation process consisting of an evaluation of the procedures used by the states to produce the counts. This validation process initially emphasizes the provision of technical assistance to states to upgrade their data collection procedures and includes the monitoring of SEAs for compliance with those provisions in the Act pertaining to counts.

Organization of the Report

The remainder of this section discusses some of the issues regarding validation of the counts. Section II describes our conceptualization of validation. Section III presents our recommended design for BEH validation procedures. Section IV discusses our observations on current child count procedures in a few states that we visited while developing validation procedures. Section V summarizes our recommendations.

Issues Pertinent to Federal Validation of Child Counts

The development of a set of validation procedures that is both practicable and meets BEH's administrative obligations requires consideration of several issues:

- (1) The definition of the population to be counted for funding.
- (2) The role of BEH in validation vis-a-vis the role of the states.
- (3) The priority that should be given to the child count validation tasks among all the tasks BEH is mandated to perform under PL 94-142 and the emphasis that BEH should place on technical assistance vs. compliance monitoring.

Defining the Population to Be Counted

The definition of the population to be counted determines what is to be validated. Section 611 of the Act specifies that this population consists of handicapped children ages 3 through 21, who are residing in the state, and who are receiving special education and related services. The complexity of the definition of this population can only be appreciated after one has examined the Act and the regulations, since the terms "handicapped children," "special education," and "related services" are terms that these documents define.

The regulations contain much more specific definitions than does the Act. For example, the definition of the term "handicapped children" in the Act consists of a list of the nine categories of disability and the specification that a child needs special education and related services because of one of these disabilities. Only "specific learning disabilities" is further defined in detail. Included in the definition of special education is that it be "at no cost to the parents."

In the regulations, the basic defining criteria are extended by adding more specific factors for each handicapping condition, and, more importantly, by adding stipulations about how the child has been evaluated and placed. Thus, in order to be counted, children must:

- Be between the ages of 3 and 21 inclusive.
- Reside in the state.
- Have been evaluated as being mentally retarded, hard of hearing, deaf, deaf-blind, speech impaired, visually handicapped, seriously emotionally disturbed, multiply handicapped, orthopedically impaired, other health impaired, or as having specific learning disabilities, where these terms are defined in the regulations.
- Need special education and related services because of their impairments.
- Have been evaluated and reevaluated, and placed in accordance with procedures described in the regulations (121a. 530-121a. 534), which include the use of appropriate testing and evaluation materials administered by trained personnel, evaluation on the basis of more than a single test result by a multidisciplinary team knowledgeable about the child, and placement in conformity with the rules on least restrictive environment and an individualized education program.

- Be enrolled on the specified dates in a school or program that provides "specially designed instruction, at no cost to the parents or guardians, to meet the unique needs of a handicapped child [definition of special education specified in section 602(16) of the Act]."
- Be receiving whatever related services (such as transportation, physical therapy, and psychological services) as necessary to assist such children in benefiting from special education.
- Not be counted by a state agency under PL 89-313.

As can be seen, the population of interest is very complex. Criteria for belonging to the population include matters of evaluation, need, placement, and service delivery, as well as age, state of residence, and handicapping disability. Estimation of the population size is therefore technically difficult, since the question of a child's membership in the population covers such a variety of criteria. The complexity of the population also implies that the validity of the counts is closely related to compliance with the Act.

Although in the Act itself, the population to be counted by the state for funds allocation was not defined as being the same as the population of children being served in compliance with all provisions of the Act, in the regulations the two populations are defined as virtually equivalent. In the regulations, the inclusion of placement requirements, requirements for trained diagnostic personnel, and requirements for nondiscriminatory testing as factors for counting children adds the dimension of compliance to the question of who is to be counted.

For all the children receiving special education to be members of the population to be counted (according to the regulations) the state must already have implemented most of the provisions of PL 94-142.* And procedures by which states count children for funds allocation would be

* Although the term "special education" is defined as "at no cost to parents or guardian," the words "free appropriate public education" are not encompassed by the Act or the regulations pertaining to the child count for state allocations.

dependent on procedures by which states assure themselves that LEAs are providing education in compliance with the Act. BEH therefore must view the validation of the counts as logically secondary to monitoring compliance with the provisions of PL 94-142. Since states need technical assistance to achieve compliance, the nature of the regulations suggests that the logical ordering of events should be:

- Technical assistance in implementing PL 94-142.
- Monitoring compliance with provisions as elaborated in the regulations.
- Validation of counts of the population meeting the criteria.

However, because count validation cannot be delayed until full compliance is assured, and because the regulations themselves state "the annual report of children served is not a compliance document,"* SRI has assumed that, initially, a valid count means that children counted for federal grant purposes are those actually receiving special education and related services at no cost to the parents. Thus, validation activities recommended for BEH do not include checking to assure that children counted have been evaluated by an appropriately constituted team, have an individualized educational program, are placed in the least restrictive environment, and the like.

BEH Role Vis-a-Vis States' Role

In PL 94-142 the primary responsibility for ensuring a free appropriate public education for all handicapped children is assigned to the states. Sovereignty of the state's educational standards is acknowledged in clauses about the 3-5 and 17-21 age groups and in clauses about educational programs eligible for reimbursement.

With regard to the counts, the Act requires that the count of handicapped children receiving special education and related services provided by each SEA in the first year be certified as accurate and unduplicated.

* Appendix A, "Analysis of Final Regulations (45 CFR Part 121a) Under Part B of the Education of the Handicapped Act," Federal Register, Vol. 42, No. 163, August 23, 1977, p. 42515.

The regulations require a continuation of the certification in subsequent years and specify that the SEAs are responsible for establishing the data collection and aggregation procedures within the state. Furthermore, each state's Annual Program Plan is required to contain procedures by which the SEA intends to recover from LEAs, funds that were made available for children erroneously classified as handicapped. There is no similar clause directing the Commissioner to recover money from SEAs for erroneously-classified children. Thus, the states have the primary responsibility for validating the LEA counts and assuring the accuracy of the count they submit for federal reimbursement. Along with the responsibility, the states should have the authority to develop their own systems to meet their obligations under the Act. What role, then, should BEH play, especially with regard to verifying the accuracy of the counts at the level of the LEAs within states?

While there is no specific clause in the Act directing the Commissioner to validate the count or to audit the LEAs to verify accuracy, USOE's authority to validate and obligation to verify accuracy all the way to the LEA level is clear.* BEH's responsibility to validate the count on which the amount of federal funds to each state is authorized, is implied by the Commissioner's duties to administer the Act and is more explicitly addressed in the General Education Provisions Act (PL 90-247 as amended). While BEH need not duplicate the states' procedures or generate an independent count, it must make checks to assure that distribution of federal funds is as intended. Unlike ESEA Title I allocation formulas, which are based on census and welfare data maintained by the Federal Government, Part B of the Education of the Handicapped Act (EHA) now requires that the formula be based on state-submitted data. BEH has an obligation to verify the accuracy of these data.

* Regulations for the General Education Provisions Act (45 CFR 100b.477) permit BEH, as a delegate of the Secretary of HEW, to have access to any records of grantees and subgrantees that BEH deems pertinent to the grant of funds.

According to the pass-through provisions of the Act in section 611, 50% of the state entitlements in FY 77-78 and 75% of the state entitlements in subsequent years are to be distributed among LEAs in proportion to the share of handicapped children aged 3 to 21 being served by the LEA. Thus, on the one hand, in validating the state counts, it is incumbent on BEH, under its broad responsibility to administer the Act, to validate the accuracy of the LEA counts; they are the constituents of the state counts, and the basis for allocating funds to LEAs. On the other hand, the fact that there are over 16,000 local public school systems and a daily-increasing number of consolidated agencies authorized to serve handicapped children makes it infeasible for BEH to monitor the universe of LEAs on a regular basis. Thus BEH must have some means of sampling LEAs within states to accurately assess the degree of compliance with the Act, the accuracy of the count, and the extent of SEA needs for technical assistance.

BEH Priorities

Allocation of resources for validation of the counts will depend in part on the priority BEH assigns to this task relative to the others and the total resources available. Validation of the counts is but one of many tasks necessary for proper administration of the Act. Technical assistance, compliance monitoring, and evaluation activities can focus on child identification procedures, evaluation and placement procedures, due process procedures, or procedures by which individual education plans are developed and implemented, to name a few.

The approximate level of effort BEH is to invest in validating counts of handicapped children is dependent on the priority of this task relative to those involved in administering other provisions, and on the degree of refinement with which BEH decides to pursue validity.

In discussions with BEH staff, it appears that, although the Commissioner's responsibility to ensure that funds disbursement is based on valid counts may be of equal priority with his responsibility to monitor SEA and LEA compliance with the due process or IEP provisions,

the resources (staff, time, money) invested in these two tasks do not need to be equivalent. Because the count procedure does not affect the educational program offered to children and because counting children is a lot less complex than instituting due process or IEP procedures within each state, we assume that BEH would choose to devote less staff time and effort to the former than to the latter task. Since BEH receives annual program plans from each state and since staff of the Division of Assistance to States plan to make systematic visits to half of the states each year, we have tried to design a count validation procedure flexible enough to be meshed with these already-existing activities. Depending on how thoroughly BEH wants to investigate state count procedures, additional staff needs will range from none to a single specialist to one specialist for every cluster of states.

The Commissioner is mandated under section 617 of the Act to "co-operate with, and furnish all technical assistance necessary" to SEAs in matters relating to the implementation of the provisions of the Act. He is mandated under section 618 of the Act to measure and evaluate the impact of programs authorized under the Act. Finally, he is responsible for the proper administration of the provisions of the Act, and in particular for monitoring compliance. BEH must decide on the proper balance among these roles with regard to each of the provisions of the Act.

In designing a validation procedure, we have argued that, initially, technical assistance should be emphasized over compliance monitoring. We argue that helping states to generate accurate counts must precede invalidity/noncompliance determinations for two reasons:

- SEAs have not yet been informed what is expected of them in the way of acceptable count procedures. BEH must first decide what standards are to be met and then share these expectations with the states.
- As discussed under Definition of the Population To Be Counted, we cannot know if a count is valid unless we know whether those handicapped children counted are being served in compliance with some other provisions of the Act.

The other studies currently being conducted by the Council for Exceptional Children (CEC) on definitions of handicapping conditions across states, and by the Management Analysis Center (MAC) to assess selected states' management information capabilities in educational programs for handicapped children show that BEH recognized the need for and planned to assist SEAs in meeting the information requirements of the Act. Our recommendations for BEH validation procedures are consistent with those plans.

II CONCEPTUALIZATION OF THE VALIDATION PROCESS

Introduction

In its strictest interpretation, validation consists of appropriately comparing the object to be validated with a known standard. This conceptualization is modeled on the validation procedures used in science and commerce where, for example, to validate the weight of a product purchased, it is compared to the weight of a standard. When standard procedures and weights are employed, it cannot be argued that the weight of the product purchased is correct and that of the standard is not. Therefore, if there is a discrepancy between the weight of the standard and the weight of the purchase, the conclusion must be that the weight of the purchase is in error.

If the above example is used as an analogy, the problem of validating state counts of handicapped children being served would be that of appropriately comparing the state-reported counts to standard counts. At this time, however, there are no standard counts; if there were, there would be no need for state-reported counts. With the use of data from existing literature, it is possible to generate estimates of the number of handicapped children being served in each state; and comparison of the state-reported counts with such estimates could be made. However, discrepancies between the two sets of numbers could not be attributed solely to invalidity of the state counts. Indeed, if good procedures are used by the states, it would be sounder to attribute discrepancies between estimates and state counts to invalidity of the estimates.

For example, a random sample of the units to be counted could be used to estimate the size of the population of handicapped children being served. It might be proposed that these estimates be used as standards.

We may ask what sampling plan would enable us to know the size of the served handicapped population more accurately than the state education agency count does. It is usually simple to quantify the accuracy of the estimates resulting from a given sampling plan in terms of the probability of their being within a known percentage of the number being estimated. It is not simple to quantify the error in a state-reported count. Whatever the manner in which this quantification is done, it will entail deviations from an unknown standard. Consequently, a comparison of the error in a sampling plan and the error in the state-reported counts is not possible. However, since counting a sample is often subject to the same errors as counting the population, and since in addition there are sampling errors and bias, the state counts, if conducted using comparable counting procedures, are preferred estimates of the standard.

Consequently, no basis exists for judging the validity of the state counts by examining their deviation from expected. Such situations are not unusual. Estimates and counts generated by a number of agencies are subject to error and the degree of error is impossible to specify. Under such circumstances the quality of the procedures used to generate the data is the criterion of validity.

If the procedures are inadequate, the results are extremely unlikely to be valid; if the procedures are adequate, the results will be valid. The classic example of this situation is the United States decennial census. There is error in the counts. But if there are no flaws in the procedures, the census count is the standard for other estimates of the true count.

For the state counts of the handicapped to be valid, we must require that the states' procedures be sound. The soundness of the procedures can be judged partly by the reasonableness of the resulting counts, but primarily by comparing the procedures with a set of standard procedures. The reasonableness of the results may be assessed by their internal consistency and their agreement with other estimates of the true counts.

To the question "What procedures can be used as standards for SEA procedures?," the answer is, those procedures that produce an accurate census.

Characterization of the State Count as a Census

The count of handicapped children being served within each state must be obtained by BEH for disbursement of federal funds under section 611(a). In turn, the states must have the counts of handicapped children being served in each LEA or IEU to determine entitlements under the pass-through provisions of the Act in section 611(d).

As mandated in the Act, and specified in detail in the regulations, the SEAs are responsible for reporting the state count by April 1 to BEH. Each SEA is responsible for designing the data collection procedure, establishing the timetable, and obtaining certification of the counts obtained from LEAs. Each SEA is also responsible for aggregating the data from the local agencies, for preparing the report to BEH, and for certifying the state count. Finally, the SEA is responsible for assuring that documentation is maintained to allow for state or federal audits of the accuracy of the count.

Thus, the count process mandated by PL 94-142 has the following characteristics:

- It is conducted through state educational agencies.
- It is subject to state and federal audit.
- It is periodic, since it is required annually.
- No provision is made for estimation.

The essential features of a population census are: individual enumeration, universality within a defined territory, simultaneity, and defined periodicity.* PL 94-142, and the regulations, in essence, call for each SEA to conduct a census of handicapped children receiving special education and related services within its state. This does not

* Shyrock and Siegel, The Methods of Demography, 1971.

mean that each handicapped child being served must be contacted personally solely for the purpose of generating the count. It does mean that enrollment or other records must be used to identify and count the handicapped children being served.

The process by which each state-reported count is to be collected satisfies the definition of a census of that state's population of handicapped children receiving special education and related services. The fact that the Act places the responsibility on each SEA to establish a census, provides us with a convenient means for establishing standards against which the Commissioner may evaluate the procedures implemented by the states: namely, compare state procedures to conventionally recommended census procedures.

There follows a description of the steps in conducting an adequate census. Ideally, if these steps are carried out, the resulting counts will be the standard counts. That is, if these procedures are done flawlessly, there is no need to validate further. Of course there will be flaws. As we discuss below, good procedures involve checking for errors at every level of detail and systematically evaluating the results.

Steps in Conducting an Adequate Census

Our discussion of the steps in conducting an adequate census generally follows that of Shyrock and Siegel, in The Methods of Demography, Vol. 1, Chapter 3. We will provide more detail on validating a census in Section III. The six major steps are:

- Organizing statistical offices
- Planning
- Pretesting
- Collecting the data
- Processing the data
- Evaluation of results.

Organizing Statistical Offices

There are many possible schemes by which the SEA might organize staff to make the handicapped child count. Three types of organization commonly encountered are:

- Central office with permanent local offices
- Central office with no local offices
- No permanent central or local staff.

The second type of office would depend on SEA staff to collect as well as aggregate the data; it would not depend on local agencies for much of its data, in contrast to the first type where all data would be collected under local aegis. In the third type of organization, each time the data are to be collected, a new ad hoc organization is established. While organization per se is not a crucial factor in conducting a satisfactory census, organizations that foster experienced staff are to be preferred. Subsequently, it will be seen that an important element in conducting a good census is the availability of staff who know the territory to be covered, the territory's idiosyncracies, and those factors that may adversely impact the quality of data.

Planning

The first step in conducting a census is planning. Under this topic are grouped the following considerations:

- Defining concepts
- Selecting enumeration techniques
- Designing collection forms
- Designing data processing techniques
- Listing places to be enumerated
- Designing census evaluation procedures.

Defining Concepts--The counts have very little chance of being valid unless care is taken to ensure that concepts are defined in operationally realizable form. The terms "special education and related services," "handicapped children," "ages 6-21 inclusive" and any other

terms used in establishing the content of the census must be defined such that the method of classifying each child can be unambiguously determined. These concepts must be used consistently throughout the enumeration and data processing.

Selecting Enumeration Techniques--The SEA has many choices available among enumerating techniques, depending on its resources and existing data-collection apparatus. Existing records at the SEA (e.g., a weekly-updated registry of children designated for special educational services), the LEA (e.g., list of children receiving special education and related services), or school level (e.g., a special education teacher's class record book) are the most likely sources of information.

It may be necessary to collect data from each public and private school and other educational institutions depending on where records are maintained.

Each enumeration procedure has its own sources of potential error, and these should be considered in selecting the technique, designing appropriate safeguards, and designing the census' evaluation procedure.

Designing Collection Forms--The SEA should design a form consistent with its enumeration technique. Instructions to the persons collecting data should be included with the form, and it should indicate where children receive their special education and related services. Children are to be counted where served, not necessarily where they reside or where their funds originate.

Designing Data Processing Techniques--The data-processing techniques must take into account the type of input data, and the units for which tabulations will be made. Provisions for aggregating data must be incorporated into the system, including procedures for detecting duplicate counts of children. The interface with SEA procedures for eventually allocating funds to LEAs also needs to be designed.

Listing Places to Be Enumerated--For an SEA, this is a list of all those educational agencies or institutions where counts of children receiving special education and related services may be located. That is,

this is a list of each agency and institution responsible for maintaining records of such children, whether or not it delivers the services directly, in the child's home, or pays for services at another institution.

The listing of places to be enumerated is an ongoing task that entails (1) finding these responsible agencies, (2) recording new agencies, (3) deleting agencies no longer in service, and (4) assuring that each agency other than a public school system can be linked to the appropriate LEA. Obviously, this last task must be coordinated with the data processing in order to credit LEAs with the counts from private agencies and other institutions in their jurisdiction.

Designing Census Evaluation Procedures--At the planning stage of a census, consideration must be given to the method of evaluating the census. The SEA should know how good its data are. The options generally considered are:

- Reenumeration
- Comparison of successive censuses
- Internal consistency checks
- Checking totals against independent registries
- Matching against individual records such as:
 - Successive censuses
 - Periodic surveys
 - Independent registries
- Post-enumeration sample survey
- Combinations of any of the above.

Below we briefly describe these techniques.

Reenumeration. Reenumeration is seldom seriously considered in large censuses. The state handicapped child counts may not represent too large a population, however. Thus in cases where there is reason to believe that there were significant errors, reenumeration may be feasible.

Comparison of successive censuses. This technique is very valuable where there is available a time series of censuses. But, obviously, this technique could not be used for the first few years, until censal procedures are well established.

Internal consistency. The usual application of this idea would make assumptions about the distribution of characteristics by place in comparison to the distribution over all places. Units that deviated greatly from the "grand mean" of a characteristic would be flagged.

Check against independent registries. By this technique totals are checked against independent sources for the same populations.

Matching against individual records. In this technique census records for individuals are matched against records from a previous census, periodic survey, or independent registry. If two independent censuses were conducted by an SEA each year, one for the October count and another for the February count, then this would be a convenient technique for a within-year check.

Post-enumeration sample survey. This technique entails re-enumeration only in selected LEAs and other agencies and institutions. However, as will be discussed in more detail later, the results of such a survey must be treated cautiously, since the second enumeration could be subject to many of the same errors as the original. This technique has the closest correspondence to an audit of any of those we have discussed. That is, the post-enumeration sample survey could take the form of a review of the documentation required to be maintained at the local level to verify the accuracy of the count. Such an audit could be periodic so that every agency would be included once every few years or it could be conducted by means of a sampling design.

Pretesting

The planning of a census is a fairly complex task, because there are so many factors that may invalidate the census counts. Therefore,

most censuses have a pretest phase in which all components are tried out in a realistic context.

In the pretest phase, the entire process of collecting and processing the data is evaluated. Ambiguous instructions on forms, poor lines of communication, and the usefulness of field procedures are assessed on a small scale.

Collecting the Data

After pretesting, the next step is to collect data. Two types of census are usually found: de facto, in which the person is counted where he is; and de jure, in which a person is counted according to his residence. Analogously, for the count of handicapped children, there is the question of which state or which agency within a state gets credited for a child being served. The question can arise if a child's legal residence is in one state (or LEA) and he is being served in another state (or LEA)--that is, if the state or agency responsible for his receiving the services is not the same as the agency that is delivering the services. The Act specifies that the within-state distribution is on the basis of the number of handicapped children being served in the LEA.* No mention is made of the source of funds, except that it may not be the parents or guardians. That is, the Act disregards which agency provides the major support for a child's educational program.

Two types of enumeration techniques are distinguished by demographers: the direct interview or canvasser method, and the self-enumeration or householder method. The same techniques applied to SEA counts of handicapped children receiving special education, would correspond to canvassing places listed as responsible for such children, versus mailing such places self-report questionnaires. The most common type of census is the self-enumeration technique, and we feel that most SEAs would use this method.

* Section 611(d).

It is at the data collection stage that careful design of the data collection forms and instructions will pay off. If the forms make clear where the handicapped children are being served, then the appropriate LEAs will receive credit for the service.

Processing the Data

The data processing step entails the receipt and control of the questionnaires or other data collection instruments, the coding of responses, and the tabulation of the counts by IEA to implement the pass-through provisions of the Act.

The substeps depend on the means available for data processing. The first substep is the editing of data. In this step inconsistencies are checked, and, if necessary, follow up is done. After editing, the data are coded by converting the responses into codes suitable for the tabulation equipment to be used. The coded data are then entered into the tabulating equipment (if tabulation is done by machine); usually, this involves keypunching and verification of entries. The data are then tabulated, and the resulting output checked for inconsistencies and reasonableness.

Although careful data collection instructions can reduce double counting, the processing of the child count data by the SEAs must also include checks for double counting. This may be a major problem for some states because of limitations in the identification of individual children imposed as a result of efforts to guarantee confidentiality. At the stage when the SEA is aggregating the LEA data, double counting should theoretically only be a problem when a child is counted in more than one LEA. That is, LEAs should have included procedures that eliminate double counting within the LEA. The SEA should ensure that instructions in the LEA data collection forms specify which LEA may take credit for a child, so that, insofar as possible, the problem of double counting is resolved prior to the data processing phase.

Evaluation of Results

Good practice dictates that states employ some means of evaluating their censuses, since errors may occur in any step of the gathering and processing of the data. Aside from processing errors, a census is subject to errors in coverage and errors in content. Coverage errors arise because every unit in the list to be covered was not reached, the list of agencies was not complete, or because some units did not report all present. In an SEA-conducted census of handicapped children receiving special education and related services, errors in coverage would arise if some local agencies or institutions were missed, or if some children for which the agency is responsible were not reported.

Content errors are errors introduced because information on persons covered in the census is in error. In the SEA-conducted census of handicapped children, information on children could be in error regarding type of handicap, place of service, or age, as well as whether service is provided at public expense and the like.

Several means for assessing census results were mentioned in our discussion of the planning phase. Here we will mention the two types of post-enumeration surveys that have been used to assess errors in coverage and content.

The post-enumeration coverage survey is based on a scientifically designed area sample. Each area sampled is canvassed by a specially trained interviewer. If the same method were applied to the censuses of handicapped children, the SEA staff would canvass to see if some agencies responsible for the delivery of special education and related services had been missed.

The post-enumeration content survey is based on a sample from the list of places used to conduct the census. For this type of survey, carefully trained interviewers gather the data required for the census. Comparisons between the special interviewer's results and the results of the original procedures help assess the bias in the census' content.

For the SEA census, two issues would be addressed in the content survey: (1) erroneous classification of children as handicapped and being served, and (2) erroneous classification by age, major disability, or LEA credited.

BEH Monitoring Activities

It is clear from the preceding discussion that BEH's post-enumeration evaluations in states with adequate procedures would be essentially the same as the evaluation done by the state. However BEH would perform its evaluation independently, beginning with an explicit examination of each state's total procedure for conducting the census. In Section III, the detailed steps for BEH's validation of state handicapped child counts are described.

III THE DESIGN OF A VALIDATION SYSTEM

As discussed in Section I, BEH's validation system must deal with several issues, including:

- BEH's role in compliance monitoring, technical assistance, and evaluation as related to various provisions of the Act.
- BEH's role vis-a-vis the states' role.
- The ability of states to comply with all provisions of the Act.
- BEH and SEA priorities in implementing the Act.

In the following paragraphs, our resolution of these issues is discussed.

For most states, many of the provisions of the Act require drastic changes from existing practice. For example, the requirement for a census of children served is a drastic change from the existing practice where states use child-days of service as the key measure of the need for funds. Generally, the Act puts primary administrative responsibility on the states, specifying that states will ensure that sufficient records are kept for BEH audit and evaluation purposes. Yet, BEH recognizes that it will take time for states to come into compliance with all provisions of the Act. It was noted in the introductory section of the proposed regulations and restated in the final regulations that "The actual impact and consequences of the statutory provisions and problems which states and local educational agencies may have in implementing these provisions are not known at this time."^{*}

Because BEH is explicitly required to supply technical assistance for implementation of the Act and is required to evaluate the effectiveness of procedures undertaken by the states and LEAs we argue that the validation system too should be oriented first toward technical assistance, not compliance. An important component of BEH's evaluation of a state's activities,

^{*}Federal Register, Volume 42, No. 163, p. 52474.

then, will be assessing how well states have done in using BEH-provided assistance.

Consequently, our validation plan is two-phased. The first phase should last about 1 year. It is oriented toward technical assistance and pilot testing of audit and validation procedures. The second phase is devoted to monitoring compliance with specified census procedures and strict validation of counts.

In the first phase, the steps for conducting a valid census described in Sections II and III of this report would be used as guides for technical assistance. In the second phase these steps would be used as standards against which to judge states' compliance with good practice, to judge the validity of counts which result from state procedures, and to apply appropriate sanctions for invalid counts submitted by SEAs.

Scope of Validation Procedure

The validation procedure we propose in this report is primarily for Phase I activities. In making our recommendations for activities in this technical assistance phase we assumed that the BEH staff configuration would remain about the same as currently.

Figure III-1 shows a schematic of the process recommended for BEH to use in validating state handicapped child counts. We have shown three evaluation steps: an evaluation of state census procedures, an evaluation of the results of the state's census through an edit check, and an evaluation of SEA responses to failure of the edit checks.

The sequence of events shown in the diagram is from the point of view of BEH activities. The first event is an evaluation of state census procedures. This involves reviewing the relevant portions of state plans, interviewing SEA and LEA personnel, and sampling LEAs for an independent count. If the procedures are judged inadequate, the counts are judged invalid, and technical assistance is given. With this technical assistance the state recounts.

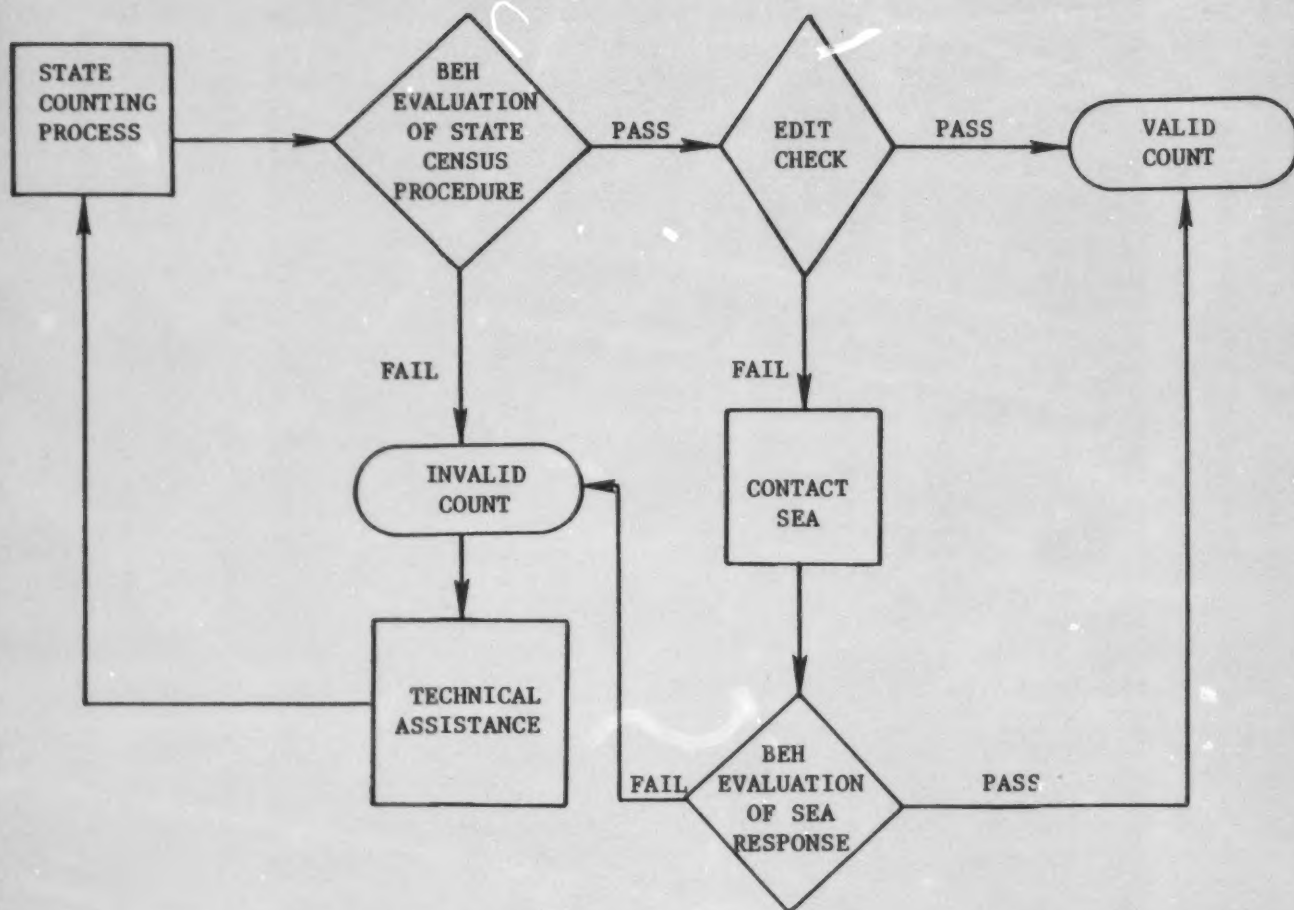


FIGURE III-1 SCHEMATIC OF BEH PROCESS FOR VALIDATING STATE HANDICAPPED CHILD COUNTS

If the procedures are adequate, the data are edited. The edit process is such that it is possible for states with inadequate procedures to pass. Consequently it is important to verify the procedures first. If the edit is passed, the count is judged valid. If the edit is failed, the state is contacted and questioned about the cause for failure. If the state's response is adequate, the count is judged valid. If not, it is judged invalid and technical assistance is given, if necessary, and the proper adjustments to the counts are made.

The following subsections describe these processes in detail.

Evaluation of a State's Census of Handicapped Children

BEH should evaluate a state's censal procedures through three sources: The State's Annual Program Plan, telephone and personal interviews with the responsible state officials, and an independent survey of local responsible agencies. During Phase I these activities will be accompanied by technical assistance and data collection. The data will aid the technical assistance effort and provide the basis for making a scientifically sound sampling plan.

The steps in conducting an adequate state census (previously described in Section II) are discussed below in detail, in order of their importance for BEH validation. In Phase I, the description of these steps or procedures should be used to guide BEH-imposed requirements for state record keeping and BEH requirements for the State Plan's description of the counting process. The description of the procedures should also be used to guide the questioning of state personnel who are responsible for conducting the census. In Phase II, the description of these procedures should be used as standards against which to judge state practices.

For state census procedures to be adequate, the utmost care should be exercised at each of the six steps of conducting a census as described in Section II. Options in each of the steps are discussed below under four headings in order of importance to BEH.

- Evaluation
- Organizing, Planning, and Pretesting
- Data Collection
- Data Processing.

The most important procedures for BEH to evaluate are the steps the state took to evaluate its results.

State Procedures for Evaluation/Validation

The best evidence that a state is exercising care in making the counts is that the state itself has a good system for validating them. This system, if adequate, is a sign that the census procedures have been thought through and the weak spots analyzed.

The states have the same options as BEH for evaluating their own census results. These are:

- (1) Post enumeration sample survey
- (2) Matching against individual records
- (3) Reenumeration
- (4) Edit checks
 - (a) Comparison of successive censuses
 - (b) Internal consistency checks
 - (c) Check total against independent estimates.

The evaluation procedures implemented by a state will depend on whether independent records or counts of handicapped children are available that can be compared with the counts mandated by PL 94-142. If this is the case, then the SEA evaluation can involve matching against individual records or checking the counts against independent totals.

Ideally, the procedures for generating the PL 94-142 mandated counts should be part of an integrated system for producing statistics on the population of handicapped children receiving special education and related services. That is, the same system that produces data necessary for the administration of state special education programs should also be capable of producing the counts mandated by PL 94-142. In this way the counts

or estimates needed for one program can be cross-checked with those needed for the other.

To date, BEH knows little about the states' capability for integrating the various counts of the handicapped into a general information system. However, BEH currently has a contract with Management Analysis Corporation (MAC) to investigate 27 states' capabilities. As a first step, BEH should study the MAC reports carefully for ways in which the state counts to be submitted for federal reimbursement purposes can be validated by comparison with, say, counts the states use for allocating state funds for handicapped.

As a second step, BEH should request that states describe the relationship between counts for BEH and other counts in sufficient detail for validation. Such information might be required in the State Plans submitted during Phase I. For example, counts for federal purposes must have some relationship to average daily attendance, average daily membership, or service-hours data. States should inform BEH what this relationship is.

During Phase I the first degree of integration achieved by a particular state may be used as the practical standard for other states. As discussed in Section IV, BEH may have to deal with the fact that some states may not now, or ever, have the resources to integrate their data collection systems on the handicapped population of interest. In such cases, states will need to rely on evaluation techniques that do not require an integrated system. Below each of the evaluation techniques are discussed.

Post-Enumeration Survey

States should spot-check to assure themselves that their mandated procedures are being correctly executed. These spot checks can take the form of a post-count-content survey. The specification for the design of such a survey appropriate to Phase I are included in Appendix A.

BEH must examine the validity and appropriateness of the post censal survey. BEH should note that these spot checks need not be based on a random sampling design. A stratified, pseudorandom or purposive

sample will give states a very good qualitative assessment of the reliability of their procedure. Random sampling is required only if quantitative estimates are required.

To accomplish its purpose, the post censal field check should meet four requirements:

- It should constitute a separate count, independent of the original count.
- It should involve one-to-one matching and comparison of records.
- It should be conducted by the most skilled and experienced staff available.
- If it is to generate quantitative estimates, the sample should be representative of the whole state and all handicapping conditions.

The ultimate units providing service, IEUs, LEAS, schools, or Head Start Centers, must be clearly defined. The preferred method is to sample randomly from the list of such units used to generate the count. However, as discussed earlier, not enough is now known about the variability of errors in LEA's for states to make a scientifically sound sampling plan at first. As experience is gained about the actual number, size, and capabilities of individual units, a rigorous plan can be developed.

Matching Against Individual Records

States may have several independent sets of records on the population to be counted. For example in states where Head Start children are counted, independent registries of the children might be obtained. In such a state, procedures should be developed to verify that children on the two files match.

BEH must assess whether the state system for determining the degree of match is adequate. Eventually an adequate system with random post-censal samples and quantitative error estimates will guarantee that the state will know if fewer than 95% of the records which should match, do match.

Reenumeration

States should be prepared to recount if there is evidence that the existing count is not acceptable. BEH must evaluate the states' criteria for the decision to recount. Since it is doubtful that any states have considered this matter, BEH must make state education agency officials aware of it.

It is generally agreed that the U.S. Decennial Census, if carefully done, will have about a 3% inaccuracy over the total population count. Larger errors are common for certain subpopulations, such as non-institutionalized black males, or ethnic groups with large numbers of illegal immigrants. States that satisfy the criteria we propose will achieve accuracy comparable with that of the U.S. Census. For the special population of handicapped children receiving educational services eventually the state should be able to state that its procedures are likely to result in a count which is not more than 5% deviant from the true total count.

In states that use reenumeration as a validation technique, BEH must evaluate the reenumeration, just as it evaluated the original count procedures.

Edit Checks

States may use a variety of edit checks where integrated systems exist. While it is not possible to describe the wide variety of these in advance, BEH will be able to evaluate these based on the descriptions of procedures found in State Plans, if it is proposed in guidelines or regulations to require such descriptions. The most common edit checks would be:

- Checks based on estimates from other counts in the integrated data collection system.
- Internal consistency checks; states should ensure that LEA totals balance, do not exceed known limits, and are reasonably based on the size and capacity of the LEA.
- Comparison with successive censuses; states should compare current counts with previous counts on an LEA by LEA basis. Marked changes should be investigated and confirmed.

Certification of Accuracy

Good practice requires that states accompany their counts with an estimate of the counts' accuracy. This should include an estimate of the percent of over- or under-counting of the total number of children receiving special education and related services, together with a full indication of the methods used for evaluating the completeness of the data. Any adjustments to the raw data as reported by responsible local agencies must be justified.

States may describe their procedures for establishing accuracy and for edit-based adjustments in their State Plans, or they may make a separate report. BEH should not require that these certifications be completed before the counts are submitted. Post-count checks may take another month or more to complete. Based on the certifications, and on the other information the states submit regarding validation of their own count, BEH validation staff will have an excellent idea of the quality of state procedures and the validity of the data the procedures yield.

Organizing, Planning, and Pretesting

Since states have not been conducting the counts as a routine matter, they had to plan explicitly for the count activities. BEH may evaluate the execution of the state counts by reviewing the states' plans for counting and the corrections to the plan as the counts proceeded. In the following paragraphs, we supplement the discussion in Section II on planning activities. In Phase II, BEH may use the following descriptions to judge a state count; in Phase I, these descriptions will be useful to BEH for giving technical assistance to SEAs in the area of planning.

In order to plan the child count procedures, clarification of the legal basis for the count is important. This refers not only to the mandate of PL 94-142, but to the administrative authority given the SEA by the state legislature. This authority fixes responsibility for the count. A review of administrative authority provides a basis for enforcing the cooperation of local agencies.

The first step in establishing the census procedure is organizing the state office to conduct the counts. Ideally the state office should have administrative control over the persons who actually conduct the count. At a minimum, states should know who the enumerator in the LEA is. BEH should check that the state office has an accurate list of these persons with their phone numbers.

The state office should assign a staff person to supervise the persons doing the counting. Ideally, a state-level supervisor would handle several enumerators; he would answer their questions and perform the state validity checks for his supervisees.

BEH should check that the state office has a calendar of operations. The calendar should show activities in three broad areas: precount activities, count activities, and post-count activities. A provisional calendar should be made as early as possible and updated as events are rescheduled. The calendar should show coordination of the federal child counts with other counting activities on the same population.

Precount activities include locating the enumerators, contacting them to explain the authority for the count and its content, and disseminating the rules for mapping state definitions into the federal definitions. Ample provisions for clarifications and questions should be made. As early as possible, forms should be designed, then mailed to enumerators.

Count activities include reminding enumerators of the count procedures, the requirement of unduplicated counts, and scheduling the receipt and control of forms.

Post-count activities include editing and aggregating data, and the post-count field checks.

BEH should ensure that the state maintains a system for keeping up-to-date records on agencies responsible for servicing the children to be counted. This list must be coordinated with the list of enumerators.

For states in which a large number of forms must be processed, plans must be made for the receipt, editing, and coding of these forms for

tabulation. Inadequate care at this step will result in lost forms and in the processing of grossly erroneous data. It is very difficult to trace down errors in the tabulations, if the data processing plan is not designed with this possibility in mind.

BEH should check on the steps taken by the state office to inform the enumerators of the relationship between the federal definitions and the state definitions of the handicapped to be counted. BEH will be able to assess the importance of the problem of relating the definitions in the regulations to the state's definitions by carefully reviewing the Council on Exceptional Children's report on state definitions. At this time there is reason to believe that the problem will be significant.

BEH should check the state's forms for gathering the counts, forms for documents control, and forms for post censal checks. The following principles should be observed:

- Forms should be assigned a set of unique numbers according to their function. One employee of the state office should control the orderly assignment of form numbers.
- Forms should be of standard size.
- Identification items--LEA number, enumerator number, and supervisor number--should be uniformly and conveniently placed.
- Forms should be designed so that control of them can be easily maintained throughout processing.

BEH should check the State's Plans for document control. The state office should clearly understand the enumeration process, and to the extent legally possible, it should control the enumerations. It should know where all the count data originate and have copies of the enumerator-completed forms. The state needs this information to design good post-censal checks.

The final planning events are collection procedures and post-count checks. BEH can be confident that those states that pretest their systems are exercising the degree of care necessary to get highly accurate counts.

States in which procedures for data collection are planned by the individual enumerators, states in which the individual enumerators are

unknown to the state office, and states with inadequate document control have little chance of producing valid counts.

In those states that have developed clear lines of organization, have described the relation between state and federal definitions and have designed good forms and plans for document control, up-to-date lists of responsible agencies and enumerators, and plans for post-censal field checks, there is every chance that valid counts will be obtained. In any event, such states are in a position to know how good their counts are.

Data Collection

After reviewing a state's validation procedures and its plans for conducting the count, BEH will know a great deal about the quality of that state's data. Under the topic of Data Collection we consider two issues. The first is the choice of counting method. The second is the state's detailed procedures for counting.

As mentioned in Section II, there are two types of census, de facto and de jure. In the first type, a person is counted where he is, in the second type, he is counted where he resides. Analogously, for the count of handicapped children, the question is whether to count the child where he is served or where he resides. BEH should check that states resolved this issue so that the count is based on the number being served in an LEA.

States may choose between two methods of enumeration methodology. In the canvasser method, an enumerator goes to each LEA and counts children from the LEA's records. In the self-enumeration method, the chief administrator of the LEA is responsible for counting.

If a state uses the self-enumeration method, BEH should check that the state knows how the chief administrator had the form filled out. If the canvasser method is used, BEH should check to see that the state office has instructions specifying what records are suitable to be counted: central files, teacher's roll books, or individualized educational program plans (IEPs). BEH should check that enumeration took place on the correct dates.

BEH should check to see that the state office has means of handling counts in special situations, such as children receiving educational services at home, and children being served through welfare agencies or special programs, such as Head Start.

Finally, BEH should check that the state office exercised adequate supervision of enumerators and other staff involved in collecting the information.

Data Processing

States will differ widely in the techniques they choose to process their count data. Acceptable techniques must be reliable and meticulously executed.

BEH should check for three features:

- Adequate checkout of tabulation process
- Adequate edit checks to remove gross errors
- Provision for tracing of processing back to raw data.

The utility of the first two features is obvious. The third feature is indispensable, if there appear to be errors in tabulations of a large data set.

Summative Evaluation of State Count Procedures

In the preceding subsections we discussed the factors BEH should consider in the evaluation of the state count procedure. Table III-1 shows individual events BEH should check for in assessing these factors. The question remains, when are the procedures good enough? The answer depends on BEH standards. If an extremely high degree of accuracy is desired, BEH will have to demand that the states satisfy all the requirements we have mentioned. If BEH wishes to get deeply involved in the count process or in judging the relative significance of various kinds of errors, we recommend that they call on the Bureau of the Census to obtain assistance.

Table III-1

SUMMARY LIST FOR BEH EVALUATION OF STATE COUNT PROCEDURES

I. Evaluation

- A. States should be able to describe the relationships between BEH counts and other counts of the same population.
- B. States should be able to cross-validate counts submitted to BEH by matching records on several files.
- C. States should have clear criteria for determining the count to be invalid.
- D. States should have edit checks.
- E. States should have a post-count validation survey, preferably, but not necessarily, using random selection.
- F. States should supply a certification of degree of error. States should have a reasonable estimate of their over- or under-count.

II. Organization, Planning and Pretesting

- A. States should review the federal and state laws which authorize the count.
- B. States should organize a permanent statistical staff for conducting the count and instructing enumerators.
- C. States should maintain a list of enumerators: persons who actually conduct the count.
- D. States must maintain a system for currently listing all responsible local agencies.
- E. States should plan for directly supervising the counting process.
- F. States should have a calendar of operations that is kept current.
- G. States should have well defined procedures for the receipt and control of data.
- H. States should have procedures for informing enumerators of state and federal definitions of terms.
- I. States should have well defined forms for collecting data, recording the receipt of data, and working the data through processing.

III. Data Collection

- A. States should choose their enumeration method: canvasser or self-enumeration.
- B. States must resolve whether to count children where they reside or where they are served.
- C. The state should know how the enumeration is done:
 - (1) If the canvasser method is used, the state trains the enumerators.
 - (2) If the self-report is used, the state must control the instructions given to the enumerator.
- D. The state should clearly define those records that are acceptable evidence that the child is in the population to be counted.
- E. The state should have clear definitions of the events to be counted.
- F. The state should have provisions for handling special cases.
- G. The state should directly supervise the count.

IV. Data Processing

- A. States should have procedures that:
 - (1) Thoroughly check out tabulation procedures.
 - (2) Edit data to remove gross errors.
 - (3) Provide for the tracing of processing back to raw data.

BEH Editing Procedures

The objective of editing the state counts is to catch gross errors in state reporting. We have stressed that procedures must be verified before the results of the edit can be taken at face value, but during editing some information may be uncovered that the investigating state census procedures did not reveal.

The proposed editing procedures involve three operations. The first is a check on the arithmetic in the reported counts--BEH should check that sums are correct. The second is a check on the reasonableness of results; that is, the order of magnitude of the counts. The third is a comparison of the counts with counts from successive years and between periods within each year.

Procedures for evaluating the first edit factor are obvious. BEH should assure itself that the count data are free of errors in addition.

The steps for validating the second edit factor are not so clear, since judgment is involved. To aid BEH in assessing the order of magnitude of results, we have prepared state-by-state estimates of the counts for 1978. These estimates are based on the prevalence rates for each handicapping condition reported in the literature both overall and by age, race, and poverty level. The details of our estimation techniques are discussed in Volume II of our report.

We have prepared two sets of estimates per state; one is a high estimate and the other a low estimate for each age category and handicapping condition. States with counts outside these bounds, or outside a specified percent of these bounds, should be asked to review their procedures to assure BEH that the number as reported is correct. States with adequate procedures will be able to respond satisfactorily and the count corrected or confirmed. States with inadequate procedures will have their counts already judged invalid.

In Volume II, we discuss the limitations on our estimation procedure, and explain why the estimates are suitable only for assessing the order of magnitude of the counts. For the same reasons, we have no good

understanding of the relationship between the estimates and the counts that would be reported from censuses with good procedures. Consequently, the upper and lower limits we have supplied should not be applied mechanically or used in a rigid manner. At best they have validity for Phase I activities, although the methodology we used can be extended to any time interval.

The third edit validation step is a comparison of successive count results. Throughout Phase I, as state procedures become better and better, the most accurate estimate of the current year's results will be last year's. Thus the best edit check is to ascertain whether this year's data are abruptly different from the preceding year (and if they are, whether there is a reasonable explanation).

BEH should have a low threshold for deciding to interview states regarding edit discrepancies. In states with good procedures, most anomalies will have already been noticed, and explained, before BEH receives the data.

Evaluation of States' Response to Edit Checks

Evaluating states' responses to BEH's inquiries on editing is essentially the problem of evaluating the states' validating system. States with an inadequate validation system will be unable to justify their counts. States with adequate validation systems will be able to defend their results, or will know them to be invalid.

We have already reviewed how BEH may validate the states' validation systems. In the next section, we discuss how to evaluate states which have passed all checks, but which may be producing invalid counts anyway.

The Role of Sampling in the BEH Validation Procedure

In the BEH validation process, there are two justifications for sampling. The first is that BEH is unable to visit each LEA to establish conformity with all provisions of the Act. The second is that BEH should independently sample to satisfy itself that states that seem to have good

procedures and that report results within the realm of possibility, are, in fact, as good as they seem.

Because such states have counts that seem valid, the question arises, how should BEH choose among them? Random selection from fewer than 50 units is hardly justified. However, the BEH sampling plan may be based on purposive sampling. As mentioned in connection with state validation systems, purposive selection of units to be analyzed is appropriate, if quantitative estimates of errors are not desired. Since there is no basis for generalizing among states with different diagnostic procedures, definitions of conditions, and different educational priorities, we see no role for the random selection of states in the BEH sampling plan. Random sampling is preferred for selecting LEAs within states, however.

We recommend that states be purposively picked for review from those states that have been judged to have valid counts. The LEAs should be picked by using the Phase I sampling plan presented in Appendix A.

Many criteria could be used to select samples from the states that passed all other tests: We could examine the best states, verifying that they are models of good practice. We could examine states that were barely adequate, assessing the impact of their poor practices. However, at this time, it seems most efficient to select states that are to be examined for reasons other than those connected with the count.

BEH has already implemented a plan for visiting states (25 per year) to assess their compliance with, as well as to evaluate progress in implementation of and to provide technical assistance on, the several provisions of PL 94-142. While not all of these issues are directly connected with the count, it would be rather efficient for BEH to integrate the LEA validation procedures with the other investigations. Consequently, our recommendations for sampling are to purposively sample states that have already passed BEH validation criteria and that are scheduled for visits. From these states, LEA's would be sampled based on the plan we present in Appendix A.

From the results of the LEA survey, BEH will obtain an idea of the accuracy of the counting procedures used. Since the size of the sample and the sampling rules cannot be prespecified (see Appendix A), BEH may be into Phase II before independent estimates of the count based on a rigorous sampling plan will give quantitative support for BEH validity criteria.

However, it should be remembered that the sampling estimates are not adequate as standards for validating the counts. The survey does inform BEH of errors in the content of the count. However, the survey is subject to the same coverage bias as the count, since the sampling frame is the list of places enumerated.

Below, we illustrate some ways in which the SRI estimates can be used in the BEH editing process.

Use of SRI Estimates in BEH Editing

Editing is an integral part of validating the BEH counts. It should be organized within BEH as an evolving system that is modified as information on state procedures becomes available. In this section, we describe some techniques that may be used to establish rational grounds for requesting a state to check its counts. The responses to these inquiries should be filled so that knowledge about the way state procedures affect the counts accumulates over time.

The discussion we present below is not based on a detailed understanding of states' counting techniques. The analyses displayed are intended only to be illustrative of ways to find which states should be called on to further justify their counts.

Method

For each handicapping condition specified to be counted in the provisional regulations for PL 94-142, SRI has estimated upper and lower bounds for each state's prevalence rate (See Volume II for a description of the method used). These bounds, aggregated to the national level, are shown in Table III-2, along with the BEH national estimates. While these

Table III-2

RANGE OF ESTIMATED NATIONAL PERCENTAGES OF CHILDREN OF
SCHOOL AGE (6 TO 17) IN NEED OF SPECIAL
EDUCATION BY MAJOR HANDICAPPING DISABILITY

<u>Major Handicapping Disability</u>	<u>Range of Estimated Percentages</u>		<u>BEH Estimates (ages 6-19)</u>
	<u>Low</u>	<u>High</u>	
Mentally Retarded	1.3%	2.3%	2.3%
Hard of Hearing	0.3	0.5	0.5
Deaf	0.075	0.19	0.075
Speech Impaired	2.4	4.0	3.5
Visually Handicapped	0.05	0.16	0.1
Emotionally Disturbed	1.2	2.0	2.0
Orthopedically Impaired	0.1	0.75	0.5
Other Health Impaired	0.1		
Specific Learning Disabilities	<u>1.0</u>	<u>3.0</u>	<u>3.0</u>
Total	6.525%	13.65%	12.035%*

* Includes 0.06% in Deaf-Blind and other multiple handicapped children not included in other categories.

Source: The estimates were taken from a variety of sources. For details, see Volume II. Methods used by these sources range from authoritative educational guesses to complex sample surveys. The BEH estimates were taken from a mimeographed document labeled, "Estimated Number of Handicapped Children Served and Unserved by Type of Handicap," dated March 1976.

estimates are reasonable for prevalence, they are not necessarily the best available for editing the 1977 counts, since not all children are served. Consequently, in our examples, we have reduced our bounds by the BEH service delivery factors shown in Table III-3. These figures are taken from the same source as the BEH prevalence estimates.

To provide illustrative edits, the modified SRI bounds were compared with preliminary 1977 counts reported to BEH by SEAs. Since our analyses, the state data have, in many cases, been revised.

Table III-3

BEH SERVICE FACTORS BY TYPE OF HANDICAP

	<u>Percent Served</u>	<u>Percent Unserved</u>
Mentally Retarded	90%	10%
Hard of Hearing	20	80
Deaf	92	8
Speech Impaired	88	12
Visually Handicapped	65	35
Emotionally Disturbed	19	81
Orthopedically Impaired	78	22
Other Health Impaired		
Specific Learning Disabilities	13	87

Source: BEH mimeograph, "Estimated Number of Handicapped Children Served and Unserved by Type of Handicap," March 1976.

We used the Statistical Package for Social Sciences to manipulate the provisional 1977 counts and the modified estimated bounds. BEH may wish to use a similar system for exploratory analyses. After several satisfactory techniques have been found, it may be most economical to efficiently program these techniques independent of a generalized analysis environment.

Illustrative Results

Table III-4 allows the editor to check whether the upper or lower bound was violated, by state and by handicap. Several points of interest are shown in this table.

- Using the BEH service rate, all states exceed the specific learning disabilities (SLD) upper limit.
- There are differences among handicaps in the pattern of violations.
- There are differences among geographic regions in patterns of violations.
- There are states with patterns that are unusual.

Table III-4

BOUNDS VIOLATIONS FOR PROVISIONAL COUNTS BY STATE AND HANDICAP

States	Newly Admitted		Hard of Hearing		Deaf		Speech Impaired		Visually Handicapped		Emotionally Disturbed		Orthopedically Impaired		Other Health Impaired		Specific Learning Disabled		Total	
	Oct	Feb	Oct	Feb	Oct	Feb	Oct	Feb	Oct	Feb	Oct	Feb	Oct	Feb	Oct	Feb	Oct	Feb	Oct	Feb
Alabama	U	U	L	L	-	-	L	L	L	L	L	L	L	L	L	L	U	U	-	-
Alaska	L	L	U	-	U	-	L	L	-	-	L	L	L	L	U	U	U	U	-	-
Arizona	L	L	L	L	L	L	L	L	-	-	U	U	L	-	L	-	U	U	-	-
Arkansas	-	-	L	L	L	L	L	L	-	-	L	L	L	L	L	L	U	U	-	-
California	L	L	L	L	-	L	-	-	-	-	-	-	-	-	-	-	U	U	-	-
Colorado	L	L	L	L	-	-	L	-	-	-	U	U	-	-	L	L	U	U	-	-
Connecticut	L	L	-	-	-	-	-	-	-	-	U	U	-	-	-	-	U	U	-	U
Delaware	-	-	L	L	-	-	-	L	L	L	U	U	-	-	L	L	U	U	U	U
District of Columbia	L	L	L	L	-	-	L	L	-	-	-	U	-	-	-	-	U	U	L	L
Florida	L	L	L	L	-	-	L	L	L	L	-	-	-	-	L	-	U	U	-	-
Georgia	-	-	L	-	-	-	L	L	-	-	U	U	L	L	-	-	U	U	-	-
Hawaii	L	L	L	L	-	-	L	L	L	L	L	L	L	L	L	L	U	U	L	L
Idaho	L	-	L	L	-	-	L	-	-	-	L	L	-	-	L	L	U	U	-	U
Illinois	L	L	L	L	-	-	-	-	L	-	U	U	-	-	-	-	U	U	-	-
Indiana	-	-	L	L	L	L	U	U	L	L	L	L	L	L	L	L	U	U	-	-
Iowa	-	-	L	L	L	L	U	-	-	L	L	L	L	L	L	L	U	U	-	-
Kansas	L	L	U	U	L	L	-	-	L	-	L	-	L	L	L	L	U	U	-	-
Kentucky	U	U	-	L	L	L	-	-	L	-	L	-	L	L	-	-	U	U	-	-
Louisiana	-	-	L	L	L	L	-	U	-	-	L	L	L	L	-	-	U	U	-	-
Maine	-	U	-	-	-	-	-	-	-	-	U	U	-	-	-	-	U	U	-	U
Maryland	L	L	L	L	-	-	L	-	-	-	L	-	L	-	L	L	U	U	-	-
Massachusetts	-	U	U	U	-	-	-	-	U	U	U	U	-	-	-	-	U	U	U	U
Michigan	L	L	-	-	L	L	-	-	L	-	-	U	-	-	L	L	U	U	-	-
Minnesota	L	L	-	-	L	L	-	-	-	-	-	-	-	-	-	-	U	U	-	-
Mississippi	-	-	L	L	L	L	L	L	L	L	L	L	L	L	L	L	U	U	L	L
Missouri	-	-	L	L	L	L	-	-	-	-	-	-	-	-	-	-	U	U	-	-
Montana	L	L	U	L	L	L	L	L	-	U	L	L	L	L	L	L	U	U	L	-
Nebraska	-	-	L	L	L	L	-	-	L	L	L	L	L	L	L	L	U	U	-	-
Nevada	L	L	L	L	L	L	L	L	L	L	L	L	-	-	-	-	U	U	-	-
New Hampshire	L	L	L	L	-	-	L	L	-	-	-	-	L	-	-	-	U	U	-	-
New Jersey	L	L	L	L	-	-	U	U	-	-	U	U	-	-	-	-	U	U	-	-
New Mexico	L	L	L	L	-	-	L	L	-	-	-	-	-	-	L	L	U	U	L	-
New York	L	L	L	L	-	-	L	L	-	-	U	U	-	-	-	-	U	U	-	-
North Carolina	U	U	L	-	-	-	L	L	-	-	L	L	L	L	L	L	U	U	-	-
North Dakota	L	L	L	L	L	L	-	-	-	-	L	L	L	L	L	L	U	U	-	-
Ohio	-	-	L	L	-	-	-	-	L	L	L	L	-	-	L	L	U	U	-	-
Oklahoma	-	L	L	L	L	L	L	-	L	L	L	L	-	-	L	L	U	U	-	-
Oregon	L	L	-	-	-	-	L	-	-	-	-	U	-	-	U	-	U	U	-	U
Pennsylvania	-	-	-	-	L	L	U	U	-	-	-	-	-	-	-	-	U	U	-	-
Rhode Island	L	L	L	L	L	L	-	-	-	-	L	-	-	-	-	-	U	U	-	-
South Carolina	U	U	-	-	-	-	-	-	-	-	U	U	L	L	-	U	U	U	-	-
South Dakota	L	L	L	L	-	-	-	U	L	L	L	L	-	-	-	-	U	U	-	-
Tennessee	-	-	-	U	-	L	-	-	-	-	L	L	-	-	-	-	U	U	-	-
Texas	L	L	L	-	-	-	-	-	L	L	L	L	-	-	-	-	U	U	U	U
Utah	L	L	-	L	-	-	L	L	-	-	U	U	-	-	L	-	U	U	-	-
Vermont	L	L	L	L	-	-	L	L	L	L	L	L	L	L	L	L	U	U	-	-
Virginia	L	L	L	L	L	L	-	-	-	-	L	L	L	L	-	-	U	U	-	-
Washington	L	L	-	U	-	-	U	-	-	-	U	U	-	-	L	-	U	U	-	-
West Virginia	U	U	L	L	L	L	-	-	-	-	L	L	-	-	-	-	U	U	-	-
Wisconsin	L	L	L	L	L	L	L	L	L	L	-	-	-	-	L	L	U	U	-	-
Wyoming	L	L	L	U	L	L	L	-	-	U	-	-	L	-	-	-	U	U	-	-

L = Lower than lower bound

U = Above upper bound

The first point is obvious from the table: all states exceed the SLD upper limit. The editor will have to determine whether the proportions are too low, the service rate too low, or the state's figures are indeed too high. It is in cases like this that knowledge of state procedures is indispensable. If state procedures are known to be acceptable, then it is necessary to question the appropriateness of the service factor or the prevalence rates. In general, the upper limit bounds are more likely to be violated, the closer the number of children served approaches 100%; in this case, we could assume that the proportion of SLD children served is probably much greater than the 20% estimated by BEH in 1976.

Several patterns of October and February changes in bounds violations can be seen in Table III-4. These patterns are probably due to the fact that between October and February case loads are built. The editor will be able to develop a time series that will inform him of the characteristic way a state's counts will change. At this early stage we can note that the counts for Hard of Hearing, Visually Handicapped, and Seriously Emotionally Disturbed show fairly dramatic changes. Not all the changes seen in Table III-4 are consistent with the idea that caseloads are growing, however. For example, four state's counts of the Hard of Hearing went down. Montana went from violating the estimated upper bound to violating the estimated lower bound between October and February. In the case of Wyoming this change in boundary violations represents a 50% drop in cases. If the editor knew of no explanation for such a change, a call would be warranted. Of course, for these data the picture is not clear, since the state counts could still be revised.

An interesting point that can be illustrated by the data in Table III-4 is the regional variation in bounds violations. The southeastern states, including the District of Columbia, tend to show a preponderance of lower limit violations. The northeast tends to have a few more upper limit violations, than lower. The area west of the Mississippi shows a slight tendency for lower bounds violations. These geographic patterns could reflect the general validity of the modified bounds, showing rural areas with more unserved children. On the other hand, they may be an artifact of the projection technique.

The editor could use geographic patterns, if valid, to detect states which may be erroneously counting. For example, Tennessee violates the upper bounds on total count while the rest of the southern states violate the lower bounds. If there is no explanation for this, a call should clarify things; it could be that Tennessee had become a leader in child find activities.

The final point we will note in Table III-4 is that some states stand out in their pattern of limit violations. Between October and February, Idaho goes from violating the lower limit to violating the upper limit on total count. Generally states' total counts go up between October and February, with six states changing from an October lower limit violation to a February nonviolation. Nevertheless, some states have patterns that may indicate that specific categories are being miscounted. For example, Alaska is generally low on its counts. However, for Other Health Impaired Alaska violates the upper bound. North Carolina, South Carolina and West Virginia, all seem to be generally low to moderate on their counts. However the Mentally Retarded counts in these states violate the corresponding estimated upper limits. If no explanation of this is available, further investigation should be done.

One form that further investigation might take is to examine the deviations from the modified bounds, where the deviation is divided by the state's 1976 population. This expression shows the deviation in units that are roughly comparable across states and handicaps. The analyses based on Table III-4 do not take into account the magnitude of bounds violations; tabulations of the normalized deviations from the bounds would overcome this objection.

Table III-5 shows the normalized deviations for the Total Counts. In this table the way that the subtractions are done implies that counts lower than the lower limit will have a negative entry in column 1 of the Table, and counts higher than the upper limit will show a positive entry in column 2. An editor inspecting the table would see that the District of Columbia and Hawaii are below the lower bound by 2 and 3 children per 100 1976 population. These are fairly impressive rates, and assuming the

Table III-5

EXCESS OVER BOUNDS PER 10,000 STATE 1976 POPULATION
BY STATE FOR FEBRUARY PROVISIONAL TOTAL COUNTS

State	Excess Over Lower Bound (1)	Excess Over Upper Bound (2)
Alabama	0.0036	-0.0301
Alaska	0.0095	-0.0183
Arizona	0.0209	-0.0084
Arkansas	0.0038	-0.0285
California	0.0121	-0.0165
Colorado	0.0243	-0.0026
Connecticut	0.0297	0.0012
Delaware	0.0309	0.0019
District of Columbia	-0.0199	-0.0584
Florida	0.0092	-0.0215
Georgia	0.0106	-0.0224
Hawaii	-0.0332	-0.0687
Idaho	0.0290	0.0023
Illinois	0.0213	-0.0083
Indiana	0.0119	-0.0162
Iowa	0.0217	-0.0055
Kansas	0.0182	-0.0090
Kentucky	0.0154	-0.0128
Louisiana	0.0206	-0.0138
Maine	0.0367	0.0098
Maryland	0.0242	-0.0063
Massachusetts	0.0381	0.0109
Michigan	0.0117	-0.0172
Minnesota	0.0219	-0.0053
Mississippi	-0.0072	-0.0444
Missouri	0.0247	-0.0041
Montana	0.0070	-0.0208
Nebraska	0.0168	-0.0104
Nevada	0.0110	-0.0166
New Hampshire	0.0043	-0.0224
New Jersey	0.0218	-0.0079
New Mexico	0.0020	-0.0274
New York	0.0047	-0.0250
North Carolina	0.0149	-0.0173
North Dakota	0.0058	-0.0213
Ohio	0.0078	-0.0207
Oklahoma	0.0141	-0.0151
Oregon	0.0279	0.0007
Pennsylvania	0.0182	-0.0102
Rhode Island	0.0221	-0.0054
South Carolina	0.0296	-0.0046
South Dakota	0.0095	-0.0184
Tennessee	0.0344	0.0036
Texas	0.0176	-0.0118
Utah	0.0454	0.0189
Vermont	0.0071	-0.0195
Virginia	0.0085	-0.0218
Washington	0.0213	-0.0062
West Virginia	0.0213	-0.0064
Wisconsin	0.0033	-0.0243
Wyoming	0.0250	-0.0015

projections and service factor are accepted as reasonable, would warrant a call to clarify matters. An examination of the upper limit violations for the total count shows that Connecticut and Delaware exceed the upper limit by only one tenth and two tenths of a child per 100 1976 population, respectively. These probably do not represent serious violations. On the other hand, Utah shows an upper limit violation of 2 children per 100 1976 population. This might be an error or we may have greatly underestimated Utah's service factor. Massachusetts shows an upper limit violation of 1 child per 100 1976 population. Again, the editor must assess the relative correctness of the service factors.

Tables such as Table III-5 can be generated by handicap as well as for the total count. However the results of these edits directly depend on the estimates. It is possible to do some edit checks without referring to the estimated bounds or to service factors.

The most convenient check of this kind is to calculate the percentage change from the October to February counts by handicap and state. We have done this for the provisional counts, with some interesting results. Here we will highlight some of the changes that were noted in the provisional total counts. However, many changes found in these counts may not hold in the final ones. The main points we noted are:

- States varied widely in their October-February percentage changes
- Very large percentage changes are found in some states
- Some states have anomalous patterns of change.

The first point is illustrated by Delaware and Idaho. Delaware changed only by 0.4%, while Idaho changed by 72% on its total count. In these early data, some counts changed by a factor of more than 300% between October and February. Washington state reduced its speech impaired count by 32% between October and February. This is almost 12,000 cases. The extent to which these fluctuations are normal for the states is not known now. Some patterns do seem atypical however; for example, Massachusetts's counts uniformly grew 14% for each handicap. Obviously, such a pattern would warrant investigation.

Choice of Edit Runs

In the preceding paragraphs we have illustrated several types of runs that will be useful for BEH's edit operation. As data accumulate, more complex runs will be possible. The question of how elaborate the checks should be will have to be answered based on their ultimate utility. Based on the provisional counts, it can be concluded that the counts should be closely edited, at least for the next few years. We recommend that at least the edits we ran be run again, and that the 1976 counts be closely compared with the 1977 counts.

IV CURRENT STATE CHILD COUNT PROCEDURES

To enable us to understand state education agency perceptions of the count of handicapped children receiving special education, the priority of the count, and current practices, we made visits to five states to interview the person responsible in that state for the planning and carrying out of counts. We wanted to explore how close to or how discrepant from accepted census practices the current child count processes are, and to test the acceptability of conceptualizing the child count as a census and of the notion that each state is responsible for an accurate census. Working in cooperation with Management Analysis Center (MAC), we selected five states, which had volunteered for MAC's study, but which MAC had been unable to visit. Our visits allowed us to study the procedures established for generating the counts in Washington, New Mexico, Mississippi, Georgia, and Illinois.

Because BEH staff shared their plans with SEA staffs and the preliminary child count regulations and forms came out as the school year started, all SEAs had proceeded in an orderly fashion to collect October 1 and February 1 counts. Although SEAs had readied themselves and staffs had collected their first count data on schedule, we nevertheless found a wide range of enthusiasm and competencies from state to state regarding the requirement to obtain unduplicated counts.

Two major factors seem to determine whether or not a state was able and eager to obtain an accurate count: first, the extent to which someone at the SEA understands what procedures need to be followed to produce an accurate, unduplicated count and, second the extent to which the state agency sees an unduplicated count as complementing or being of some advantage to its own system. The latter incentive may take any number of forms, for example, the state agency may see an unduplicated count as an aid to future planning (needs assessment), to check ADA or ADM data submitted by local school systems, or to see how state funds are serving children with specific handicaps.

A highly motivated state education agency will still come up with an unreliable count if its staff does not know how to instruct and check LEAs or cross-check data within their system. Since many SEAs do not have personnel who know how to institute careful census procedures, BEH instruction would clearly benefit them. Some of the states we visited had highly sophisticated statistical procedures in place for their own state reimbursement and planning purposes, but they could not see any way to adapt their system to the BEH mandated count. Partly because the financial incentive is relatively low at this stage, these states were unlikely to apply the same care to data collection, edit, and audit procedures for the federal child counts as they do to their own data collection; instead they fall back on untrained local personnel and simple hand tallies at the state agency with no attempt to validate data internally before sending it to BEH. For example, one state had developed its own system of counting special needs children by means of which state funds were allocated. They were extremely reluctant to change the way they were doing things to adapt to the federal mandate for a child count. Although they had a computerized system in place for their own counts, the counts for BEH were filled out unsystematically and hand tallied.

The attitude of the SEA staff member who is in charge of the counts for BEH sets the tone for the state's response to the requirement, all the way to the local level where the data is collected. The attitude is transmitted throughout the system and affects the whole process. In direct contrast to the staff attitude in the state example given above, is one state, which was willing to meet many of the specifications for conducting a good census. The person responsible for this system was extremely proud of the work that had been done to produce an unduplicated count. He viewed his responsibility to BEH as important, and also had motivation in terms of state needs as an additional cross-check on the state's own ADM counts.

The examples in the following subsections are intended to be illustrative of how the states we visited planned and carried out the October and February child counts for BEH. Each section describes the variations we

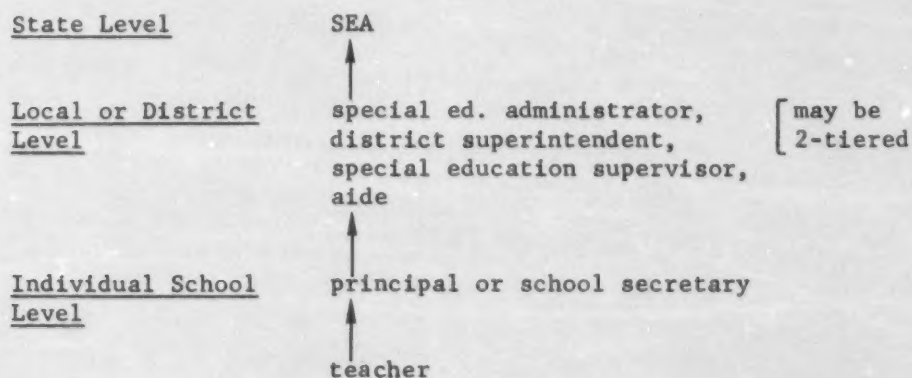
found in the few states visited in terms of the steps for conducting a census listed in Section II.

Type of Organization

No state we visited had experienced, specialized staff at the LEA or SEA level whose primary responsibility was the counts, although someone within the hierarchy had been appointed to be in charge of them in each state. The person appointed ranged from the director of special education to someone from statistical services. At the local level, usually an LEA administrator (e.g., special education administrator), would be responsible for local tasks, but these differed widely from state to state.

One SEA person in charge of counts said he was not sure who did the counts at the local level, but thought it was "probably some secretary who goes through kids' files."

Counts are either prepared at the LEA level and sent directly to the SEA for aggregate counts or they may originate at the school level and go through the LEA office. Although the LEA director signs off, the figures may not have been seen by anyone but clerks in the district office or they may have originated at the school and been checked once at the local district or IEU office level before being forwarded to the SEA. (See chart below.)



Definition of Concepts

Every state we visited experienced the problem of fitting its own definition into the federally designated system. Those states that were moving toward a noncategorical system based on child needs or on service delivery were particularly concerned with the problem of definitions. Various methods were employed to solve the problem. Some states had LEAs count children according to the state's definitions "because those definitions are the ones they know." The LEA data were then manipulated at the SEA level to correspond to BEH categories. One state sent out memoranda giving the federal definitions and a formula for converting from state to federal definitions. Two states gave federal definitions and said data should fit, but gave no formula for converting state to federal categories.

Discrepancies exist across states on three levels: (1) who is included in a category (i.e., definitions of each category of handicap), (2) the quality of the evaluation that puts a child in a category and (3) the way states convert their own categorical data to satisfy the federal standards. One state, which has a combined category that includes children who are both blind and deaf arbitrarily assigned half of those children to BEH "blind" and half to the "deaf" category.* If the individual state has consistent state-wide rules for conversion the problem is at least overt; if conversion formulas are unclear and left to LEAs, the probability of error is compounded.

Two states that have the same label for a federally designated category may, because of their own interpretation of the definition of who should be included in the category and/or the quality of the evaluation that places the child in a category, have different incidences of children in that category. There may even be errors within a state if each LEA is left to its own device in deciding which children should go in which category. Several states that have a multiple handicapped category handled the conversion differently.* In one, all children were put in orthopedically

*The August 23 regulations have provided a remedy for these particular confusions.

impaired. In another state, the children were portioned out to various other categories. One state, which services children in hospital and home-bound instructional settings, put these children in "other health impaired."

We found little consistency in the way the five states determined a child's age. Some states stated a specific cut-off date, usually the same used for school entry, others used the actual age of the child on the date (October 1 or February 1) when the count was taken, and still others merely left it up to whoever filled in forms. On our visits to LEA's in one state we found that respondents who filled out the forms automatically used the age a child is supposed to be for a certain grade level.

On the one hand, as long as the counts were unduplicated, BEH would be receiving an accurate count of numbers. However, if the data are to be used for other purposes (such as information on how many children in each age or disability category are being served nationwide), the BEH categories as filled out by states do not accurately reflect the same types of condition.

Selection of Technique

The records used to develop the counts seem to depend on: (1) the way the state is divided into districts, (2) how special education services are delivered, and (3) who is made responsible for the counts.

If the first level of responsibility for counting is allocated to a classroom teacher she seems to use her roll book to generate the counts. If the lowest level count is at the building level, an aide from the principal's office used files on individual children or class lists from teachers to generate the counts. The initial SEA instructions may or may not specify what sources are to be used to generate the numbers; in fact, the SEA may not even know what sources are being used and there may not be consistency from school to school.

If the district is the lowest level for data collection, either files kept on children or teacher lists were used as data sources. Some states

that have higher level regional or intermediate unit structures use personnel and data at this level to edit lower level counts. One state we visited used district level data as its primary data source. No state relied on SEA level data alone, but personnel at the state and intermediate unit or regional level were often responsible for some edit procedures that involved checking against data maintained in their offices.

If data were collected at all from private schools or other educational institutions, no state we visited had any idea of what records or methods these institutions used.

Design of Collection Forms

Although all the states we visited had developed some data collection forms, the characteristics of the form and particularly the instructions included, varied widely. On one end of the scale was a state with a one-page form listing federal categories and age designations, and a single page of very general instructions. The major flaw in instructions lay in their not specifying how local personnel could achieve what the instructions requested. For example, several forms noted that counts were to be unduplicated--without specifying how this was to be achieved.

Some forms did not have a space for identifying the person who actually collected the data. All forms we saw had a place for a superintendent to sign off before the data were sent to the SEA. Sometimes a person at the district level converted data from individual teacher's forms onto some summary information form.

The best state forms we saw on our visits reflected the program prototype of the child as well as the category of disability. They showed the district of residence as well as the district in which served. They also had some way of identifying individual children by a unique number that would maintain confidentiality at the SEA level, but permit duplications to be detected.

The instructions on good forms specified that copies of the completed forms were to be kept 5 years, and were specific about how to assure

unduplicated counts (with examples of possible situations). One state had a form to be filled out by each superintendent to justify each discrepancy from the states' ADM counts. All states had received the data reporting forms designed by BEH to guide them in making their first year counts. All states were making use of the BEH forms in designing their own data collection forms to conform with those of BEH.

Design of Data Processing Techniques

The forms we saw reflected the manner in which the data contained on them were to be processed. Some were designed for later hand tallies at the SEA level; some were precoded for computer processing.

One state we visited has contracted with an outside company to develop a computerized comprehensive, individual child-based system ready for use by 1978. Another state has involved many people throughout the state to assist in developing its own child register.

Two of the five states we visited had designated specific provisions for producing an unduplicated count. These steps included: a solution to the problem of children who are served in a different district from their district of residence, or out of state, and assurance that children receiving more than one service were counted only once.

States that had done the poorest job failed to identify children in a way that would allow for checking for duplication and failed to specify where the child was to be counted.

Listing of Places to Be Enumerated

In our sample of states, we found a broad divergence in the interpretation of which places were to be enumerated for the counts. The differences ranged from counting only children receiving special services within the public school system to a broad scale effort similar to "child find" to seek out and identify all possible educational institutions where children receiving special education and related services were located, and assure their counts were returned. In general, SEA staff members used

conservative standards for inclusion. Because they wished to count only those children for whom they could be sure that services met all state education agency and federal standards, they did not worry about leaving some eligible children uncounted.

Design of Census Evaluation Procedures

So that SEAs could evaluate the quality of their data, each of the five states had established some techniques. Procedures for checking for internal consistency ranged from a casual "eyeballing" of forms to see whether a region had not reported or whether a whole category had not been reported. These checks appeared to have been made inconsistently and from memory.

The two best systems used computer procedures for processing data, and could immediately uncover gross inconsistencies. One state had conducted its own study of the estimated number of handicapped children within the state; however, the director of special education did not feel this was a particularly relevant way of checking internal consistency for the counts, and remarked, "What point is an estimate when an adequate census works?" He felt other methods of evaluation were more important. This state used matching against its 20- and 80-day ADM running counts as a method of evaluating the BEH counts.

The state, mentioned earlier, which expects to have a child register by September 1978, will use data from the register to match against the child count data collected. No state we visited has yet used any other methods (e.g., auditing a sample of LEAs) to validate counts.

Pretesting

None of the five states visited had actually conducted a pretest. One state sent out forms and instructions prior to the actual count and had time to make changes based on reported ambiguities. All states made at least minimal changes in their forms and instructions between the October and February counts.

Collecting the Data

Only two states among those visited had adequately solved the problem of where a child was to be counted, and had taken measures to assure he was not counted more than once. Four of the five states visited said they counted children according to where services were delivered; but there were numerous contradictions to the stated ideal. An SEA staff member in one state said children were counted according to where they lived, but he was confused about whether children who were served out of state or even out of the district were counted, "unless someone specifically remembered that kid." He thought there might be a list of such children at the state level; but even if there were, this state had no way of identifying specific children at the state level, so a list would not have been helpful. This same person also had trouble relating how children were counted who were served in institutions, state schools, or private schools supported by state money.

Only one of the five states had specifically sought out all possible places serving children and had developed separate forms for those facilities. Another state had specific sets of instructions for counting children served in related facilities.

All five states had a procedure that required a superintendent at the LEA level to verify and sign-off before sending the counts to the SEA. We found that superintendents often automatically signed the forms without examining them or inquiring about them. Only one state required each superintendent to submit a justification form for each discrepancy between ADM and federal child count information. In states with poor instructions and a loose structural organization in which the SEA had little control over LEA activities, many LEAs collected and edited data in their own way, so there was no consistency from one LEA to another. Without knowledge of how the data were collected in LEAs, the checking or editing of data by SEA staff was virtually impossible. States that received only the numbers of children from the LEA without a way of identifying specific children also had virtually no way to edit counts except in gross terms of whole missing data sheets or missing categories of children. The best systems

were those two-tiered systems where data were checked and verified at the LEA level and again at the SEA level against other existing data.

Recommendations

Data from even our small sample of states demonstrate a clear need for technical assistance. It also seems clear that a state's data collection system is not a function of knowledge alone, but that the state must have the resources (staffing, finances) and the motivation for generating an unduplicated count for BEH. Because states are under enormous pressure to make substantial changes on a number of fronts in order to be in compliance with PL 94-142, the child count often is put in a low priority position. While priority for resources spent on this task need not be great, BEH needs to make clear to SEAs that a competent staff person should be assigned to the counts and that care and accuracy should pervade the procedures for obtaining the child count.

Because SRI's recommendations place the burden of validation to BEH on the SEAs, BEH should be sensitive to the costs to the states of establishing an adequate census and census-evaluation procedure. States vary in their ability to absorb the heavy initial costs of the counting and validation activities. While the costs of the child count may not seem large in relation to the costs of implementing individualized educational program plans for every child, many states may not be able, for example, to do a statistically valid post-enumeration survey of LEAs during the first few years.

BEH technical assistance must go beyond a mere description of what good census procedures are; such assistance should be sensitive to the existing attitudes exhibited by responsible state personnel, as well as to that state's capabilities. For example, states that feel they are doing a reasonable job by having unknown and untrained persons collect data that is later tallied but not audited or even edited, might be persuaded by BEH to see the child counts as a census. Such states could be shown by specific examples of practices within their own and other states how they might improve and attain good census procedures.

In all states, BEH could provide support for developing cross-checking systems between state data and child count data. This would provide an incentive to some states and would move the states closer to developing a system on which to base their certification of the validity of the data submitted to BEH. Currently, if the states we visited are representative of all states, then the states' evaluation of counts generated within their system is even less well understood than the census data collection procedures. Of the five states we visited, only one had sound procedures for insuring an unduplicated count, and had implemented appropriate edit and evaluation procedures to be able to say this with confidence. Another state intends to conduct its first audit of LEAs this summer. One SEA person responsible for counts in his state remarked that he wouldn't consider an audit, because it would not be "nice" to look as if he did not trust his administrators responsible at the LEA level. One state we visited was organized in a way that traditionally has given LEA's a great deal of autonomy in decision making, consequently, the problem of SEA level people auditing LEA counts becomes a particularly sensitive one if this relationship is to be respected and maintained.

None of the states we visited had had an unduplicated count before the BEH requirement. Thus, the possibility of using an independent source of counting the population (e.g. a state registry) as a procedure for evaluating the census for BEH becomes a difficult one. The two states we visited that came close to having an independent count that could be used to verify the BEH counts have a child identification number that permits them to unduplicate another state level count, for example an ADM count. Some states are reluctant to use anything, even a unique number that is only identifiable at the LEA level, that they feel might violate their own confidentiality policies. A recognition of a state's position on confidentiality must determine how a state is assisted in dealing with its own edit procedures and evaluation.

During our site visits we were frequently made aware, through our own observations and in our interviews, that there was considerable confusion about how to fulfill the responsibilities involved in achieving

an accurate child count. For example, someone told us, "if they (BEH) just told us what they wanted and how they wanted it, we could have done it."

We felt that most states would be amenable to and even eager for help in knowing what procedures to implement. However, the wide variety of attitudes and practices indicate that more than just a "how to do it" package will be needed. Although there must be consistency in the quality and type of data collected across states for the child counts, we feel that assistance to states in adopting valid census procedures should incorporate an understanding and sensitivity to each states' current attitudes and practices.

V SUMMARY

In this report we have described a validation procedure to be used by BEH to assure the accuracy of the counts submitted for federal allocations. The procedure we recommend emphasizes the states' obligations in assuring accuracy. The federal posture toward the states would be that of looking over their shoulders.

Because the Act does not allow for estimation but requires periodic enumeration of children receiving special education and related services, the count procedures meet the definition of a census of such children within each state. Thus, we recommend that the BEH validation process should consist of providing guidance to the states' planning, data collection, and internal evaluation/validation procedures. By focusing on the procedures by which the counts are made, BEH will best be able to judge whether counts are valid.

The planning, data collection, editing, and validation practices that currently exist in several states were described to give BEH a glimpse of the variations it will face, as well as to indicate the effort some states will have to make to develop acceptable procedures for making unduplicated counts and evaluating their LEA-provided data. Because many states are not yet prepared to carry out an adequate census, and because we believe that BEH is not yet in a position to use the funds withdrawal or withholding sanctions for substantial noncompliance with acceptable census practices, a two-phase process is recommended for validation. It is proposed that BEH (1) assist the states in designing a census (this includes helping them integrate their information systems to allow cross-checking counts with independent data on the same population, and/or helping them conduct post-censal surveys of their own LEAs) and (2) monitor the compliance of each state with standard census practices so that the federal government can accept the count certified by the states for federal disbursement or withhold funds when counts are invalid.

The descriptions of standard census practices in Section II and the checklist (Table III-1) in Section III could be used to inform SEAs about accepted procedures during the first phase. We recommend that the State Plan documents then be required to contain descriptions of the procedures the states intend to use in generating the child count (including collection of data from LEAs and procedures for validating these data). A review of these descriptions and a question-and-answer session on site visits to SEAs (guided by the checklist in Section III) should provide BEH staff with information on which to base a judgment about the validity of each state's count. A plan for sampling LEA and school units within states is provided as an appendix. Such a sampling plan could be used as a post-censal content survey by an SEA or by BEH to audit LEAs and estimate the error of the counts. Since we have described idealized census practices, it remains for BEH to decide what degree of rigor they will accept in evaluating state count procedures.

The validating procedures proposed are flexible enough so that BEH could invest a large or small amount in staff and resources. In general, we assumed that the counts were only one among many provisions of the Act and that the count validation task should consume a relatively small proportion of BEH's total resources. We tried to learn enough of BEH's current operating procedures (such as the 25-states-per-year visits) and capabilities to be sure that recommended activities could be integrated with other Bureau activities. A census consultant would undoubtedly help BEH staff judge the significance of deviations from good census practices within a state. Also, implementation of LEA-level audits by BEH will require a sampling statistician if quantitative estimates of error are desired.

Another component of the recommended validation procedure is BEH's edit of state-reported counts. The development of estimates of the population of handicapped children by category of exceptionality, as described in Volume II of the report, was intended for use in this edit procedure.

Appendix A

SAMPLING PLAN FOR POST-CENSAL SURVEY
OF LEA COUNTS OF HANDICAPPED STUDENTS

by

Dr. William Madow

Appendix A

SAMPLING PLAN FOR POST-CENSAL SURVEY OF LEA COUNTS OF HANDICAPPED STUDENTS*

Introduction

For a complete validation there must be records to inspect, and ultimately, there must be a verification that the condition of the handicapped is correctly stated in the records and that all handicapped children being served are listed in the records. In this case, PL 94-142 requires that records be kept but does not state the record format. I strongly recommend that BEH, in agreement with the states, help the LEAs adopt a common record keeping procedure that is satisfactory for validation as well as other purposes. BEH or SEAs should require that lists of the handicapped be kept in the LEAs. The lists should identify the persons who were in the records at the time that the LEA made its semi-annual report to the states. If desirable, the list could contain only coded identification, with the name, address, file location, and school being recorded on a separate list. If records must be kept, a simplified, standardized procedure should lead to less work, less paperwork, and improved results for the LEAs and SEAs as well as for BEH validation.

It is impossible to design an efficient sampling procedure with no information. Since the education agencies and jurisdictions in each of the 50 states is organized differently, it is not even useful to assume a standard pattern and to plan an efficient sampling scheme for this one example. Consequently, what is suggested here is a very general procedure, relatively easy to implement, that not only validates but also provides information from which an improved procedure can be designed on the basis of information obtained in the first attempts at post-censal validation. It is an iterative procedure that should improve with each performance.

*Some changes have been made to conform to the main text.

In the early stages, information should be obtained on what records are kept and how well they are kept. Because the systems of record keeping will be evolving, information on expected future record keeping should also be obtained. Information concerning the problems encountered in implementing the sample design should also be documented.

Problems occur in the implementation of any design. In the case of a survey design, the advice of a sampling statistician and census expert would be required to implement the plan. The field staff should know what procedures to follow when they encounter difficulties. It is unwise to allow the field staff to improvise if improvisation can be avoided. Detailed documentation of what was done, why it was done and what the results were should be obtained. Then, after validations occur in a small number of sites, a meeting should be held to discuss the problems that have arisen.

In this appendix, it is assumed that only an overall validation is required. If, for example, it is desirable to validate by category of handicap, by age or race, etc., the size of the sample will increase as will the complexity of the design. I recommend that unless there are urgent immediate needs for such complexities, the evaluation of the overall count should be the goal at this time. With the experience and opportunities for analysis provided by the first validation study, future improvements can be made.

It is impossible, nor would it be economically efficient, to determine what alternative designs could be considered for future use. Any book on sample surveys would provide a good list of possibilities but the choice depends on the reports that will come from the field, the analysis of the data, and whether a uniform record keeping system is adopted. My views on the minimum components of a record keeping system, briefly stated above, are amplified in the following paragraph. The survey and sampling procedures and their cost depend on three elements:

- What is to be verified?
- What records are available?
- What degree of accuracy is desired?

Validation of the LEA counts under PL 94-142 requires that there is a file for each person included in the LEA total that satisfies two conditions:

- The file contains an evaluation according to which the person is handicapped within the meaning of PL 94-142 and the accompanying regulations.
- The file describes a program of special education and related services that the person is currently receiving.

I anticipate that BEH or some other agency will, at some point, investigate whether persons classified as handicapped by the LEAs do in fact meet the definitions of "handicapped" set forth in PL 94-142 and accompanying regulations, and whether there are persons not so classified who would satisfy that definition. When this is done, I suggest that BEH use, in addition to whatever other means of evaluation are used, a standardized procedure that will enable it to compare the determinations of different states or local areas as to whether or not a child is handicapped. (At some point, it should also be determined whether the children so classified are actually receiving "specially designed instruction at no cost to parents or guardians." However, this part of validation is not to be part of the current recommendation.)

To partially demonstrate eligibility under PL 94-142, each SEA should submit a statement in its Annual Program Plan documenting its procedures for gathering data from the LEAs. BEH should require full documentation of the data assembling and record keeping procedures of the LEAs and any other education agencies (EAs) in the state (e.g., intermediate agencies or special jurisdiction schools). This should be in verifiable form (i.e., an enumerator should be able to check the accuracy of the information given BEH). Verification will be simplified if BEH requires that there be LEA lists, not necessarily transmitted to the SEA, that identify (1) the handicapped children receiving special education and related services for whom funds are requested, (2) the handicapped children receiving services from some other LEA, the SEA or some other jurisdiction, and (3) the handicapped children from other LEAs to which the particular LEA is providing services. These lists should

include identification, the location of the required file for the handicapped child, and whether the handicapped child is included in the request for federal reimbursement. There should also be lists of contact persons at each LEA. All lists should be kept current.

Until BEH requires the existence of both the files and lists mentioned above, many LEAs will not have them in satisfactory form despite the clear statements in PL 94-142 that the files are required. Even after the files are formalized, then accuracy will be uncertain for reasons other than those mentioned above. Validation by SEA as well as by BEH will be facilitated by the lists of handicapped children. These lists need not include names but should at least include LEA, file identification, location of file, and whether included in a request for BEH funding.

The lists will make it possible to check for double counting. If lists are not available, the validation procedure should include:

- (1) Questions whose answers describe the record keeping system of the LEA for those handicapped according to PL 94-142. Copies of forms and instructions should be obtained.
- (2) Questions that elicit whether this LEA is supplying to another LEA, or is being supplied by another LEA, any part of the educational program and special services for the handicapped and the names or other information of the handicapped children involved.
- (3) Identification and location of files for children included under (1) or (2) above.

The Sampling Design

Described below is a method of sampling LEAs within a state, including those LEAs providing education or services to handicapped children within the jurisdiction of another LEA. This would be a special sample of education agencies in order to check for double counting.

The LEA Survey

- (1) For each state, a sample of 50 LEAs^{*} will be selected by BEH according to the procedure stated in Attachment A.
- (2) The interviewer will obtain from the SEA for each LEA in the sample, the numbers of handicapped children in each category as reported by the LEA to the state.
- (3) The interviewer will proceed to the LEAs, and without consulting the data obtained in (2), independently compute the corresponding data using the record files, not the data provided by the LEA.
 - (a) If these files are not available an explanation of their unavailability should be made.
 - (b) If more than 1,000 files must be examined, or if the needed files are kept at several locations, the interviewer should select a subsample according[†] to Attachment B, and state the procedures used.
- (4) The interviewer will obtain from each LEA in the sample of LEAs, a list[‡] of the names and other identifiers of each child receiving special education and related services from other LEAs and the names and addresses of those LEAs.
- (5) The interviewer will compare the data on the number of handicapped by type of handicap obtained from the SEA with those the interviewer calculates from the files of the LEA. An attempt should be made to reconcile all differences (e.g., moves into or out of the LEA or categories of handicapped, etc.). All data for each LEA should be reported to BEH.

Special LEA Survey

A survey of LEAs providing special education or services to handicapped children under the jurisdiction of, or going to school in, other LEAs should include the following procedures.

^{*}In the first validation cycle this may be lowered--to no less than 25--but the risk of finding too large a confidence interval will increase. Even with 50 LEAs in the sample, the confidence interval may be large. With no information, no precise design is possible.

[†]In the large LEAs the sample may depend on how the files are kept--in schools or central offices--in folders or on computer tape.

[‡]Possibly issues of privacy and confidentiality may occur in connection with obtaining such lists. For this reason SRI would prefer to use the reports that the SEAs had obtained from the LEAs as part of the validation considerations, and ask the LEAs to do the reconciling where discrepant reports were obtained.

- (1) If one or more LEAs supply special education and related services to the children from only one LEA, a sample of pupils will be selected from that LEA's list (see Attachment B) and checked against the lists used by the LEAs in reporting to the SEA, and the amount of double counting will be ascertained.
- (2) If more than one LEA is being supplied special education and related services from at least one other LEA, then:
 - (a) If the number of such LEAs is 10 or less, the procedure stated in (1) above should be followed for each such LEA.
 - (b) If the number of such LEAs exceeds 10, a sample of 10 LEAs should be selected and the procedure stated in (1) above should be followed for each such LEA (see Attachment B).

Attachment A

PLAN FOR SAMPLING LEAs

Two alternative approaches based on different sources are given for generating the sample of LEAs. One approach, based on 1975-76 counts of pupils in LEAs as published in "Public School Systems, 1975-76," can be largely carried out in Washington, D.C. The other approach, based on counts of handicapped children reported by LEAs to SEAs, is preferable, but must be carried out in the states. This approach would require careful training and preparation of instructions for the BEH personnel.

Sample on Basis of 1975-76 Counts of Pupils in LEAs

Table 4, page XIX, of the publication "Public School Systems 1975-76" states the distribution of operating local public school systems by size of system and state in the United States, Fall 1975.

It would be preferable if in addition to the frequency distribution of LEAs there were also available the average number of pupils/LEA by state and size category. However, if these are not available the averages can be taken to be size midpoints for size categories below the largest with the average for the largest then being determined by subtraction, using Table 5. Obviously, if the averages can be obtained with the use of a computer tape containing the sizes beginning on page 3 of "Public School Systems 1975-1976," the allocation will be better.

The within-stratum sampling ratio formula then is:

$$\frac{m_i}{M_i} = \frac{m}{M} \frac{\bar{Y}_i}{\bar{Y}}$$

where:

m_i is the number of LEAs in the sample from stratum i

M_i is the number of LEAs in stratum i

$m = 50$ is the size of sample

M is the number of LEAs (in the state)

$\bar{Y}_i$ is the mean number of pupils/LEA in stratum i

$\bar{Y}$ is the mean number of pupils/LEA in the state.

It may well be that in the stratum of the largest LEAs,

$$m_1 > M_1 \quad .$$

Then define $m_1 = M_1$ and reallocate by:

$$\frac{m_1}{M_1} = \left(\frac{m - M_1}{M - M_1} \right) \frac{\bar{Y}_1}{\bar{Y}} \quad , \quad i = 2, \dots, 8 \quad .$$

If stratum 2 then has $m_2 > M_2$, repeat the process.

Select the sample LEAs from each stratum by simple random sampling using either a table of random numbers or a computer algorithm. The reason for using simple random sampling (SRS) is that it permits estimating the variances and variances from the sample itself.

Let Y_{ij1} be the number of handicapped children according to the original LEA report and Y_{ij2} the number of handicapped according to the validation, where i denotes the stratum and j , the LEA within the stratum.

Then we wish to estimate:

$$Y = \sum_{i=1}^8 \sum_{j=1}^{M_i} Y_{ij} \quad ,$$

where

$$Y_{ij} = Y_{ij1} - Y_{ij2} \quad ,$$

or we might want to estimate

$$R = \frac{Y}{Y_{..2}} \quad ,$$

where

$$Y_{..2} = \sum_{i=1}^8 \sum_{j=1}^{M_i} Y_{ij2} \quad .$$

Then the estimator of Y is

$$Y' = \sum_{i=1}^8 M_i \bar{Y}'_i \quad ,$$

where $\bar{Y}'_i$ is the mean difference per LEA in the sample from stratum i ,

$$\bar{Y}'_i = \frac{1}{m_i} \sum_{j=1}^{m_i} Y_{ij} \quad .$$

Then

$$E(Y') = Y$$

and

$$\sigma_{Y'}^2 = \sum_{i=1}^8 M_i \left(\frac{M_i - m_i}{M_i} \right) S_i^2 \quad ,$$

where

$$S_i^2 = \frac{1}{M_i - 1} \sum_{j=1}^{M_i} (Y_{ij} - \bar{Y}_i)^2 \quad .$$

The estimator of $\sigma_{Y'}^2$ is

$$S_{Y'}^2 = \sum_{i=1}^8 M_i \left(\frac{M_i - m_i}{m_i} \right) s_i^2$$

$$s_i^2 = \frac{1}{m_i - 1} \sum_{j=1}^{m_i} (Y_{ij} - \bar{Y}_i)^2 \quad .$$

An estimator that might well be preferable to Y' is Y'' , where

$$Y'' = \sum_{i=1}^8 \frac{N_i}{N} \bar{Y}_i''$$

and where

$$\bar{Y}_1'' = \frac{\sum_{j=1}^{m_1} Y_{1j}}{\sum_{j=1}^{m_1} N_{1j}},$$

where N_{1j} is the number of pupils in LEA j of stratum i , N_i is the number of pupils in stratum i , and $N = \sum_{i=1}^8 N_i$.

However, if the numerator and denominator of $\bar{Y}_1''$ have low (essentially less than 0.5), or negative correlation, using $\bar{Y}_1''$ is less efficient than using $\bar{Y}_1'$.

I strongly recommend that prior to the selection of the above sample, BEH select with probability 1 for validation, say, the 10 LEAs about which there is concern or which have the highest and lowest ratios of number of handicapped to number of pupils, or whatever other indicators are available and appropriate. Also if a large proportion of the handicapped have records in a small number of LEAs, these LEAs should all be in the sample.

Sampling should supplement, not replace, the selections made because validation is likely to be most useful.

Note: BEH may wish to sample only 25 rather than 50 LEAs/state. Whether 25 or 50 are sampled during the first 6 months or year, the data can be analyzed "easily," and a better choice of sample size and design made the next year. The first year will have many "false positives" because of starting-up problems.

Sample on Basis of Counts of Handicapped Children Reported by LEAs or SEAs

Two alternative procedures are presented below.

Procedure 1

(1) Divide SEA total, H , of handicapped by 50:

$$\bar{H} = \frac{H}{50}.$$

All LEAs reporting more than $\bar{H}$ handicapped are in the sample. Denote the number of such LEAs by m_0 and the total number of handicapped in such LEAs by H_0 .

- (2) Compute

$$H^* = \frac{H - H_0}{A} ,$$

where A is initially set to 20. Classify the LEAs not selected in (1) into A strata each of approximate size H^* and with the LEAs in a stratum having approximately equal numbers of handicapped. Proceed to the next step, unless any such strata contain either one or two LEAs. If so, include them in the LEAs selected in (1). Let m_0^* be the new number of LEAs already selected for the sample. Repeat (2) replacing H_0 with H_0^* and A with A^* where H_0^* is the number of handicapped in the LEAs currently in the sample and A^* is

$$\frac{50 - m_0^*}{2} \quad \text{or} \quad \frac{50 - m_0^* + 1}{2} ,$$

whichever is an integer.

- (3) Select two LEAs from each of the A^* strata at random. A table of random numbers and instructions should be provided each supervisor.

Procedure 2

- (1) Selection of LEAs for the Certainty Stratum. Assume that there are M LEAs of which LEA_1 is claimed to have N_1 persons who are handicapped according to PL 94-142. Let

$$N = N_1 + N_2 + \dots + N_M .$$

Assume the number of handicapped in the sample is n .

The certainty stratum of LEAs consists of all the LEAs that are to be in the sample with certainty. Some may be in the sample because they have a large number of handicapped. Others may be in the sample because they have surprisingly many or few handicapped. Others may be there because they are known to provide special education or related services to many handicapped living in the attendance areas of other LEAs and so on. Arbitrarily, a limitation is set that no more than half the handicapped can be in the certainty stratum. In special cases this limitation can be removed.

Define the number of LEAs in the certainty stratum to be m_0 and let their total size in number of handicapped be N_0 . Compute $n_0 = n N_0 / N$. Identify and list the remaining LEAs in decreasing order of size as measured by number of handicapped

$$(*) \quad N_1 \geq N_2 \geq \dots \geq N_{M-m_0} .$$

If any of the LEAs has fewer than k handicapped, combine LEAs with other LEAs, preferably geographically neighboring, so that each resulting LEA group has at least k handicapped. The number k should be relatively small. We would recommend 10 for LEAs. (Obviously, we cannot estimate the practical problems this will cause.)

Compute:

$$S_0 = k \frac{N - N_0}{n - n_0} .$$

All of the LEAs in (*) with size $N_i \geq S_0$ are added to the certainty stratum. Then m_0 , N_0 , n_0 , and S_0 are recomputed and the LEAs not in the certainty stratum are renumbered so that (*) holds for the new certainty stratum.

(2) Selection of sample:

- (a) Choose a number at random between and including 1 and S_0 .
- (b) Call that number t . Compute t , $t + S_0$, ..., $t + (m - m_0 - 1)S_0$ where $m = [n/k]$ or $[n/k] + 1$ and $[n/k]$ indicates the integer part of n/k .
- (c) Compute the cumulative subtotals of (*)

$$(**) \quad N_1, N_1 + N_2, \dots, N_1 + \dots + N_{M-m_0} .$$

(d) Then LEA_i is in the sample if, for some j ,

$$N_1 + \dots + N_{i-1} < t + jS_0 \leq N_1 + \dots + N_i ,$$

$N_0 = 0$ here. Then the sample of $LEAs_i$ consists of the certainty stratum and the LEAs designated in (d).

- (3) Selection of subsample within LEAs. If, within an LEA in the sample, the PL 94-142 files are kept at the schools then the steps stated above should be followed for selecting a sample of schools.

If N_0 is the size of a certainty LEA, then the size of sample within that certainty LEA is $n_1 = n N_1/N$. For LEAs selected in accordance with (2), the size of the sample within LEAs is k . For these LEAs, if the records are at the schools, choose two schools at random and select $k/2$ children at random for examination of the PL 94-142 files at each school. If the files are at one location, choose the k files at random from that location.

Sample if "No" Information

Sometimes, in sampling locations (schools, administrative offices, etc.) within an LEA the only information available will be that certain locations have "large" numbers of records of handicapped children, others have less, etc. Rarely will there be no information, but the available information may be very rough. The locations with "large" numbers of handicapped children will be in the sample with certainty. The other locations should be ordered or classified on the best available judgments on numbers of records. Then a systematic sample consisting of every k th location should be selected so that there are at least 10 locations in addition to the "certainty" locations.

Attachment B

SUBSAMPLING

Once the LEAs are selected the problem becomes that of selecting a subsample in order to count the records themselves. This is made more difficult because each record must be inspected well enough to be sure that what appears to be a different record may not be another folder for the same person. Also a subsample of the subsample must be selected for more thorough inspection to learn whether the record is complete according to the BEH definition of a complete record, and whether the record shows where the child is obtaining the special education and related services, in order to check for double counting.

In addition, lists of children receiving special education and training in a school should be examined to see whether these children come from other schools or LEAs. In either case, a check of every 10th such child should be made to determine whether there is multiple counting (i.e., the child may be counted in the home school, each school to which the child goes, and in the administration offices).

Let us consider several cases. Without knowledge of how the records are kept there are too many alternatives to be certain which methods will apply in any LEA. Hopefully, the first validation will provide information on how the records are being kept, or preferably BEH will require a record keeping system adequate for it to be able to discharge its validation responsibilities. (There seems little doubt that for administrative purposes at least, the larger LEAs will maintain a system that, if known, would enable a good validation sample to be selected.) Two illustrations are given below.

Case 1

In this case, the LEA is large enough to have a computerized system containing a listing of all handicapped children.

- (1) The listing should be run alphabetically by child's name to see whether the child is listed under several schools.
- (2) The listing should be run by schools or locations where records are kept. A sample of every 10th child in every 2nd school should be verified against file records.

The ratios of 1 in 10 and 1 in 2 obviously depend on the particular circumstances. But in no case should there be less than the minimum of 20 schools or half the schools (all schools if there are less than 10) and 10% of the handicapped children in the selected schools.

The same procedure should be followed in smaller LEAs where the administration can provide lists of children in the program arranged both alphabetically and by school. If only an alphabetical list is provided then a sample of schools should be designated, e.g., half the schools and every 10th child on the list should be checked against the list of sample schools to determine the records to be checked in those schools.

Similarly, if only school lists can be provided, then a systematic 10% list of names should be selected from half of the schools or 20 schools, whichever is more, and after checking the names against the lists for all other schools, the records should also be checked.

Whenever I suggest beginning with a list, it should be verified that the number of names on the list agrees closely with that number submitted by the LEA to the SEA. Also that number should be recorded.

If the central administration does not have such a list but each school has its own, a sample of schools--all large schools plus half of the smaller schools to a total of all large schools plus at least 20 other schools--should be selected and a 10% sample of children selected for each selected school. Again the children's names should be cross-checked and the records examined.

Case 2

In this case, the school system (LEA) does not maintain a list of children in the BEH program.

- (1) Such lists should be required.
- (2) The records, which are presumably in filing cabinets, should be used in place of lists. In this situation, all records should be counted and 10% inspected--the counting should include verification that a child's records are in only one folder. The 10% sample of names should be checked against the files of other schools.

Cases not covered by the above will require the assistance of an experienced sampling statistician.

The totals should be estimated for each LEA by dividing data for each record in the sample by the probability of its being selected, multiplying the probability of selecting the school by the probability of selecting the child within the school. Then the LEA totals should be obtained. These totals should be substituted in the formula given in Attachment A. This will lead to a not very large overestimate of the variance. (To derive the necessary estimates would take a great deal of time because of the multiplicity of possible designs.)